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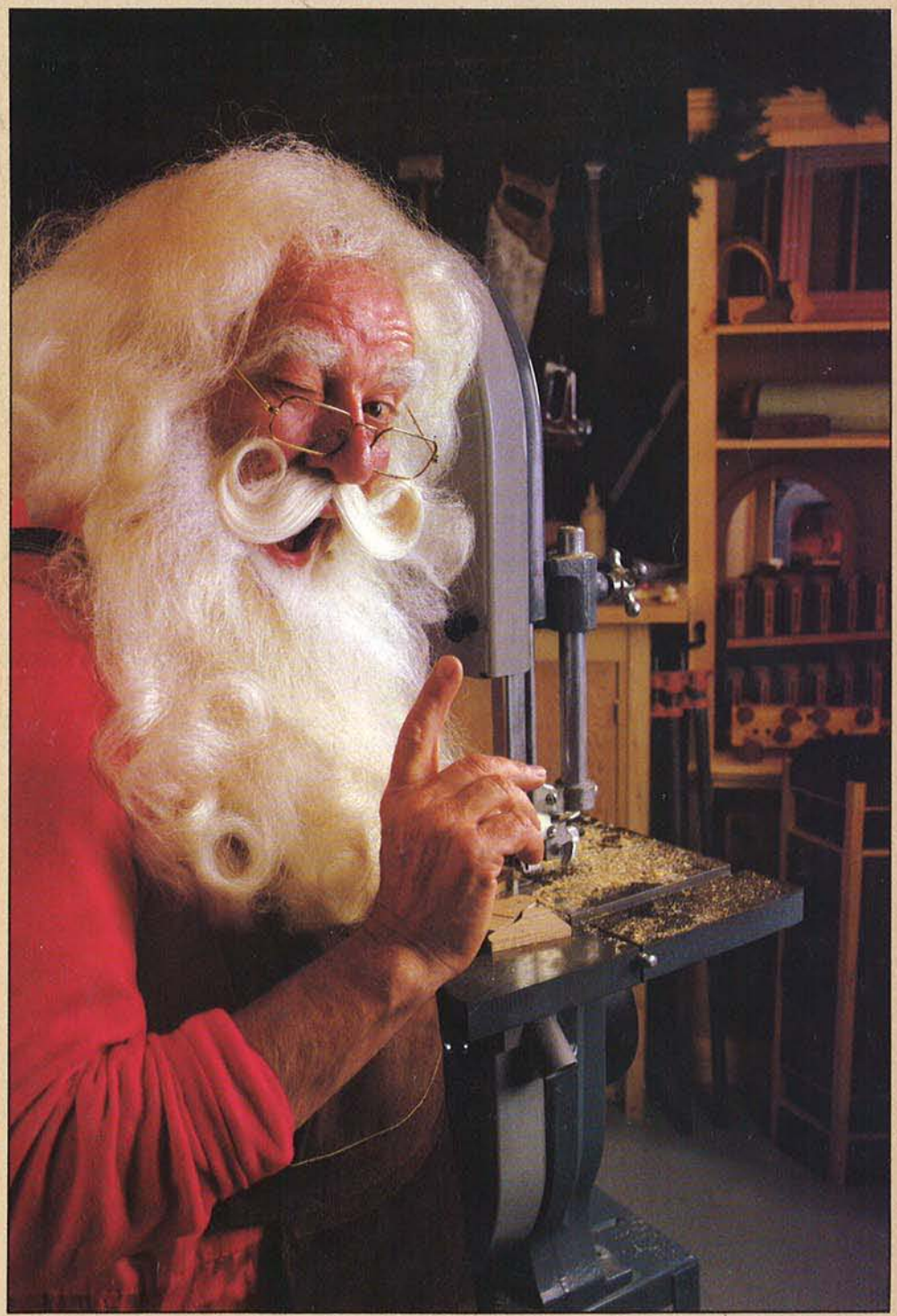
Better Homes and Gardens®

WOOD

NOV./DEC.•1984•ISSUE NO. 2

THE MAGAZINE FOR HOME WOODWORKERS

- **8 GREAT GIFTS YOU CAN BUILD** in a wink (or two)
- **Step-by-step** to picture-perfect miter joints
- **WOOD tests** portable belt sanders
- **Make your own** foot-powered coping saw
- **How to buy** cabinet-quality lumber
- **Build it** high-performance stereo speakers
- **5 fun-to-make** picture frames



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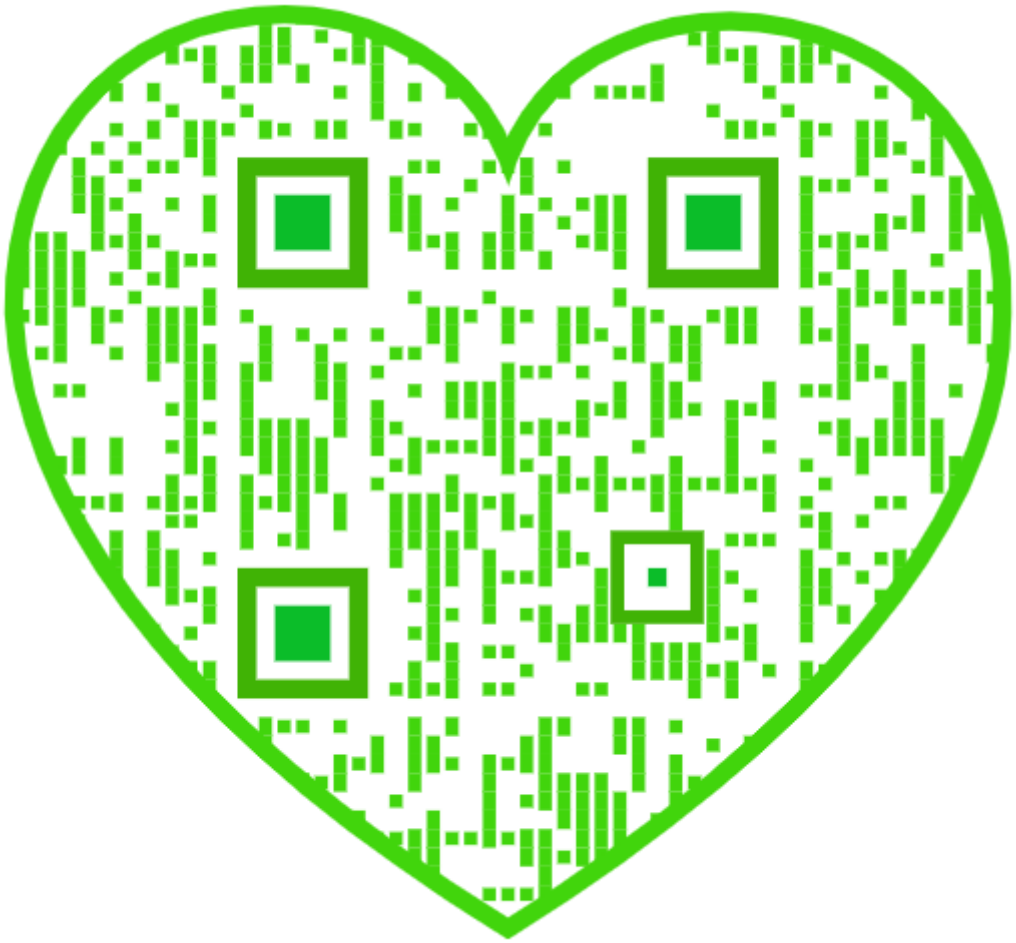
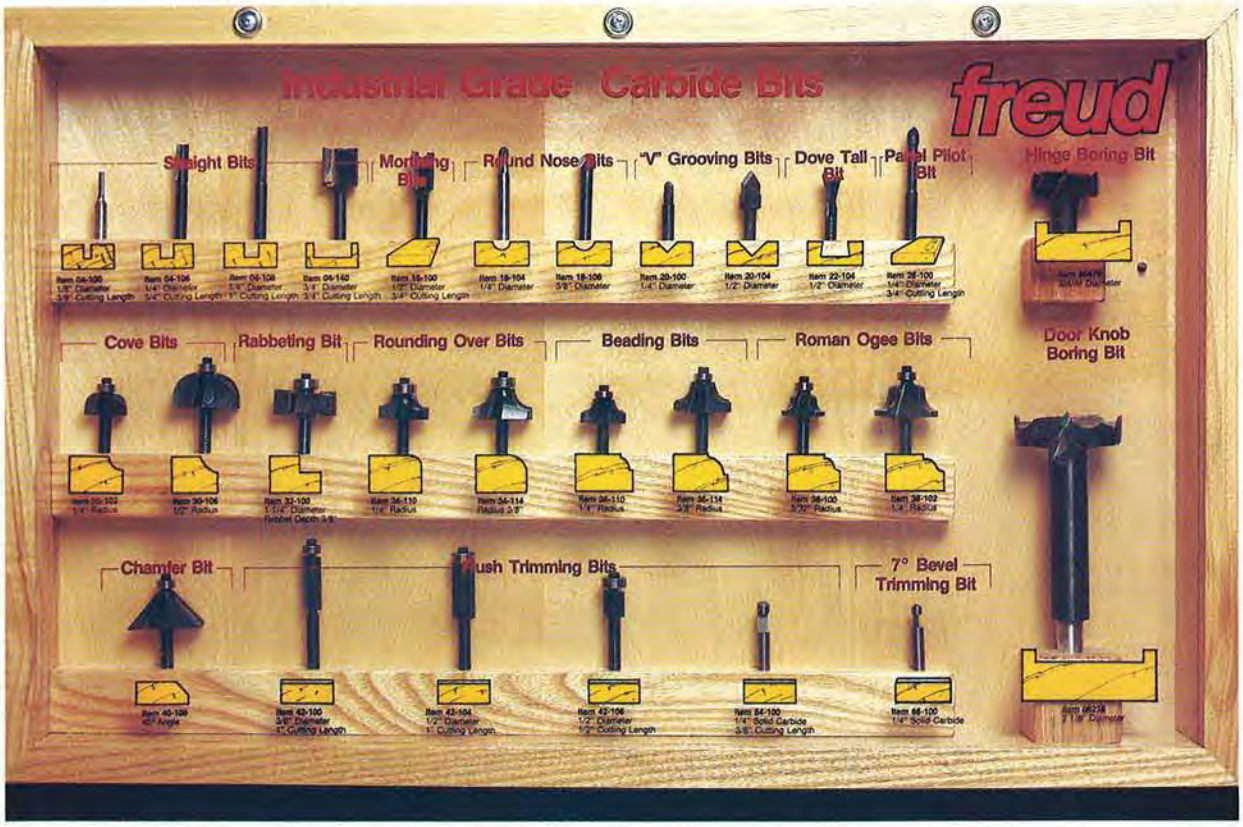


Introducing Our New Carbide Bits . . . Top Quality Plus Sale Prices!



ROUTER AND BORING BITS, CARBIDE TIPPED
ALL SHANK DIAMETERS ¼" (EXCEPT BORING BITS NOTED)

ITEM	DESCRIPTION	CUTTING LENGTH	CUTTING DIA.	RADIUS (BEVEL)	DEPTH OF CUT	LIST PRICE	SALE PRICE
04-100	STRAIGHT 2 FLUTE SOLID CARBIDE	⅜	⅛			12.01	9.61
04-106	SOLID CARBIDE STRAIGHT 2 FLUTE	¾	¼			11.05	8.84
04-108	SOLID CARBIDE STRAIGHT 2 FLUTE	1	¼			12.26	9.81
04-140	STRAIGHT 2 FLUTE	¾	¾			15.60	12.48
16-100	MORTISING	¾	½			12.73	10.18
18-104	SOLID CARBIDE ROUND NOSE	½	¼	⅛		17.64	14.11
18-106	ROUND NOSE	¾	⅜	3/16		23.68	18.94
20-100	"V" GROOVING		¼		¼	14.83	11.86
20-104	"V" GROOVING		½		½	21.15	16.92
22-104	DOVETAIL		½	(14°)	½	16.33	13.06
26-100	PANEL PILOT	¾	¼			9.43	7.54
30-102	COVE			¼	½	31.29	25.03
30-106	COVE			½	⅜	33.64	26.91
32-100	RABBET	½			⅜	27.62	22.10
34-110	ROUNDING OVER	WITH BEARING GUIDE		¼		27.62	22.10
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36-110	BEADING	WITH BEARING GUIDE		¼		27.62	22.10
36-114	BEADING	WITH BEARING GUIDE		⅜		30.03	24.02
38-100	ROMAN OGEE	WITH BEARING GUIDE		5/32		32.90	26.32
38-102	ROMAN OGEE	WITH BEARING GUIDE		¼		33.90	27.12
40-106	CHAMFER	1		(45°)		26.42	21.14
42-100	FLUSH TRIM	1	⅜			15.62	12.50
42-104	FLUSH TRIM	1	½			15.62	12.50
42-106	FLUSH TRIM	½	½			15.62	12.50
64-100	SOLID CARBIDE FLUSH TRIM	⅜				7.64	6.11
66-100	SOLID CARBIDE BEVEL TRIM	¼		(7°)		8.30	6.64
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A message to the readers of Wood Magazine from Las Vegas entrepreneurs, Richard Malott and Junior Sealy

WE HIT THE JACKPOT IN LAS VEGAS

WHEN WE BOUGHT THE AUSTIN HARDWOODS FRANCHISE

Facts

- Started August, 1980 in the depths of the recession
- Began showing profit after four months
- Sales first year $370,000
- Sales second year $725,000
- Recovered entire initial $90,000 investment in 20 months
- Doubled our warehouse capacity July, 1983 from 6,000 to 12,000 square feet
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Opinions

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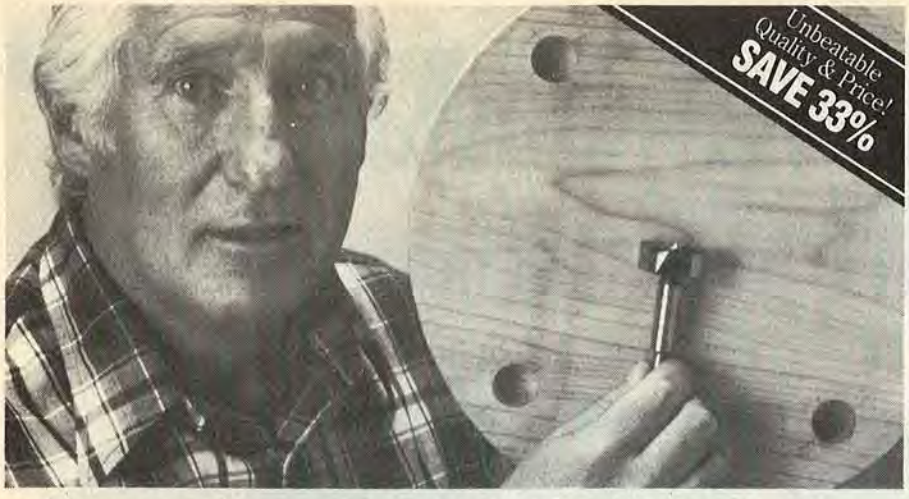

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WOOD
THE MAGAZINE FOR HOME WOODWORKERS

Nov./Dec. 1984 Issue No. 2

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Get down to fundamentals... Experience the joys of woodworking

Are you missing out on the joys of woodworking? Imagine for a moment the shine in your little girl's eyes the first time she sees the rocking horse you built just for her. Or think of the fun you'd have on a deck added to your house — built with your own hands. Maybe the cooks in your family would like a kitchen custom-made to their needs. Or consider how much enjoyment you'd get from your stereo system if you built your own entertainment center.

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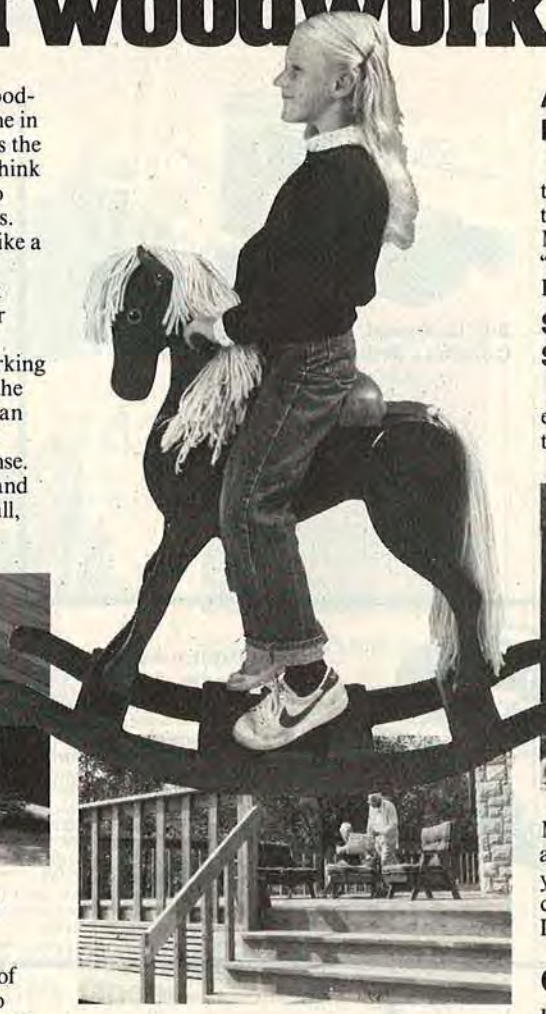

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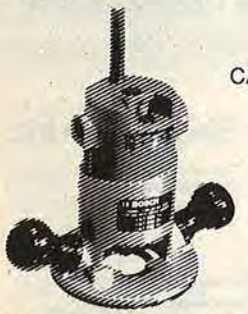

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Better Homes and Gardens®
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THE MAGAZINE FOR HOME WOODWORKERS

November/December 1984 Issue No. 2

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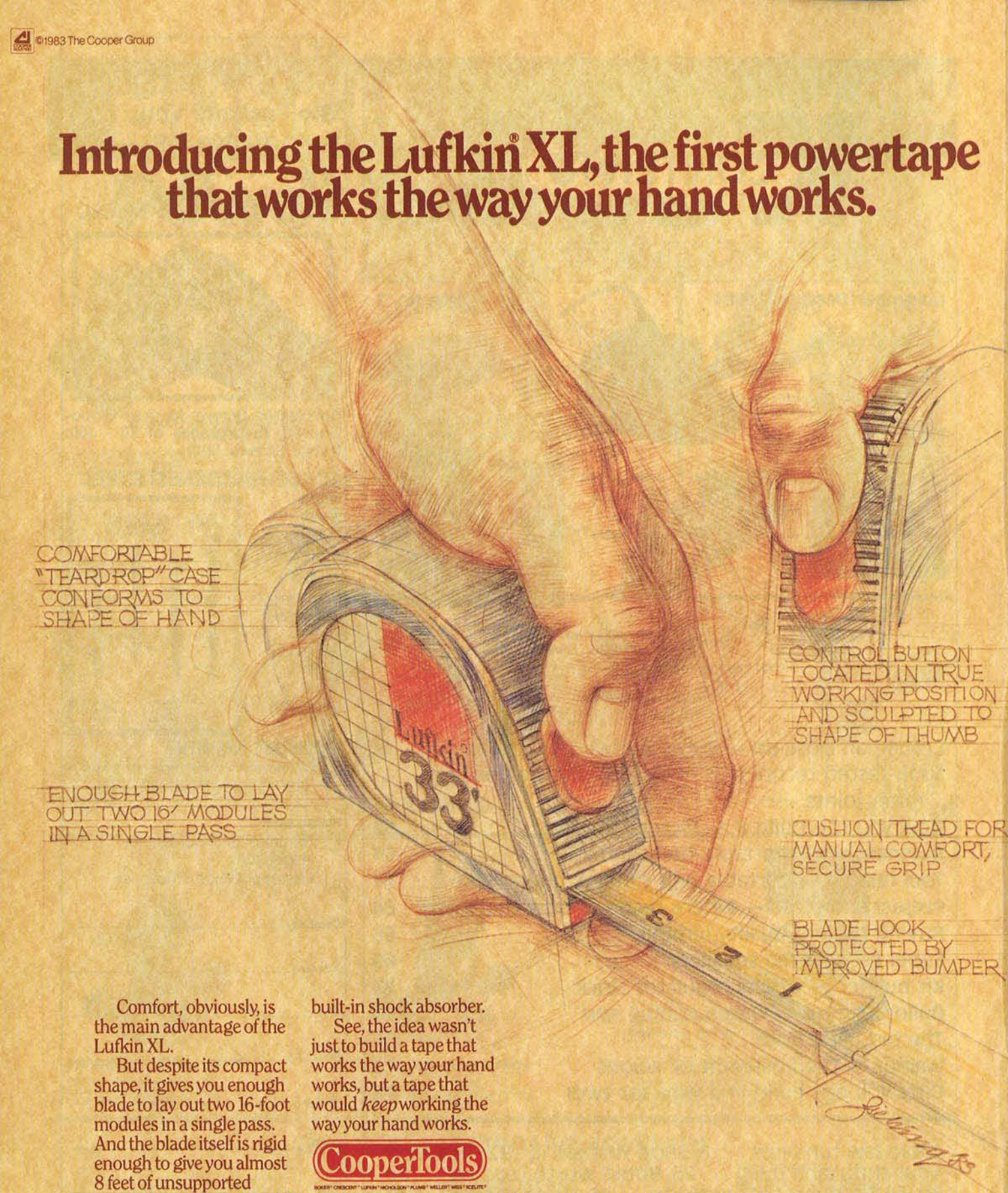
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BLADE HOOK PROTECTED BY IMPROVED BUMPER
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Comfort, obviously, is the main advantage of the Lufkin XL.

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The difference between work and workmanship.

Print this article

The Editor's Angle

For the last year or so, I've been traveling around the country meeting with woodworkers like you. And I've got to say I'm pretty impressed by what I've seen. Impressed by the quality of work that's being done, by the high level of expertise that's so evident, and most especially by the woodworkers themselves. Almost to the person, people who work with wood are great folks. I've never experienced a group of people who are more willing to share what they know with others.

My most recent excursion took me to Provo, Utah (a beautiful city) to the International Wood Collectors' Society annual meeting. Once again, I was able to talk with a group of the fine people who by anyone's definition are really "into wood". It turns out that each year at this meeting one of the highlights of the festivities is a charity wood sample auction. What a sight! Many of the Society's members bring or send in wood samples and finished projects they think would be of interest to other collectors. Tableful after tableful of these items were cheerfully auctioned off for the better part of a day. Mesquite, osage orange, cocobolo, letter wood, yellow buckeye, camphorwood, pink ivory, persimmon, burls, crotches, spalted wood—it was all there. And the prices were right, too. For more information about this woodworking organization, see our story on it on page 123.

I'm beginning to receive some feedback from you about Issue 1 and I'm glad to hear that you're pleased with WOOD so far. Here's hoping you all feel free to let me know what's on your mind. We're here to learn, too, so any input you have at any time is welcome. Beginning with this issue, Reader Letters will be a regular feature in WOOD. While we obviously won't be able to print every letter that comes in, we'll do what we can. Also if you have some questions you think we may be able to answer for you, send those along as well. We're pretty well connected in woodworking circles and also know many knowledgeable people who can probably supply the answers if we can't.

Don't be too surprised if you get a call or a follow-up questionnaire from me or one of the other staffers in the next few weeks. We want to find out as much as possible about your reaction to Issue 2—as soon as possible—so that we can make the necessary editorial changes to best suit your needs as a woodworking hobbyist.

Larry Clayton

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tune up your table saw

Making accurate cuts with your table saw is basic to the successful building of most projects. That's why it's a good idea to check out your workshop workhorse every so often to make sure it's in tip-top shape. The checks and procedures outlined on the next few pages won't take long, but they can pay big dividends in increased accuracy for a long time to come.

1 Make Sure the Blade is Parallel to the Miter Gauge Groove. If you never seem to be able to get a 90-degree cut when crosscutting material, your saw blade may be out of alignment.

Although this is an alignment that's carefully made at the factory when the saw is assembled, and often won't change with use, it sure doesn't hurt to check.

First, unplug the saw for safety's sake, then crank the blade up as high as it will go. Mark one tooth on the saw blade (we used a grease pencil for this), then adjust your combination square so the end of the scale just touches the tooth when the shoulder of the square is held against the edge of the miter gauge groove (see the photo below). Now rotate the blade so the marked tooth is at the back of the saw slot, and check again with the combination square. Obviously, the end of the scale should just touch the tooth in this position as well. If it doesn't, you've got a problem.

To fix it, you must move the whole tabletop in relation to the saw blade. If you still have the

instruction manual for your saw, get it out and see what it has to say about making this adjustment. Otherwise, look under the saw to see how the table and blade arbor assembly are fastened together. On this Sears saw, six bolts hold the blade trunnions to the tabletop. In this case, we could loosen all six bolts a bit, then tap the trunnions in the direction we wanted them to go, using a block of wood and a hammer as shown below. Recheck the blade and groove with your square, and when they're all lined up, retighten the bolts and check again.

2 Make Sure the Saw Blade Is Perpendicular to the Table. This is a particularly important factor in getting precise cuts, so it deserves some careful checking and

Continued on page 10

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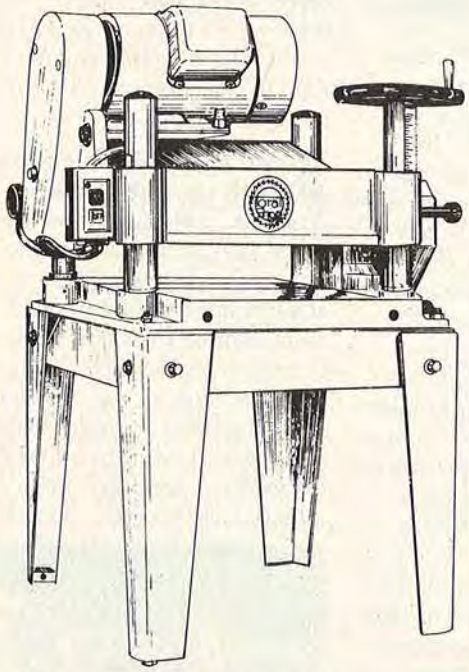

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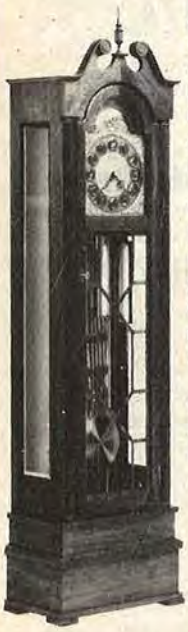

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GET THE MOST FROM YOUR TOOLS

Continued from page 8

tune up your table saw

fussing with. Leaving the blade all the way up, crank the blade angle adjustment handle back and forth a few times to make sure you have the blade set tightly at what is supposed to be a right angle to the table. Now, set your combination square on the tabletop and against the blade, as shown below, to check. Make sure the square sits against the face of the blade, between the teeth.

If you see a gap, one way or the other, you'll have to adjust the

right-angle stop to fix it. On most saws, a threaded rod with stop nuts attached for 90 degrees and 45 degrees controls the angle of the saw blade. This rod is buried down under the saw table and takes some agility to reach. The nuts usually are held in place with allen screws, so it's just a matter of loosening the nuts and turning them a bit in the right direction. Check, too, to make sure there's no sawdust buildup between the stop nuts and the surface they stop against, as this can cause an inaccurate adjustment.

Once you've set the 90-degree stop nut, crank the blade over to 45 degrees and check it with the 45-degree side of your combination square or a drafting triangle. If that angle is off as well, you can adjust the 45-degree stop nut, too.

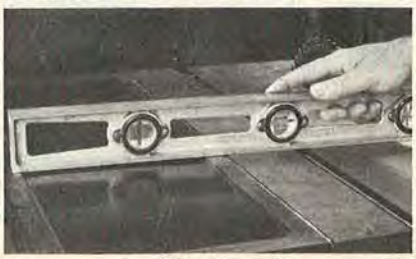
As a final test, cut a block of wood, using your miter gauge. Choose a well-surfaced piece of hardwood, as thick as practical. Mark the top side with a line the full length before you cut. After cutting, flip one of the cut pieces so the original side that was up is now flat against the saw table. Slide the two pieces together so the ends that were cut touch. If your saw blade isn't exactly perpendicular, the two pieces won't fit together exactly. As you can see in the photo below,

ours have a slight divergence at the bottom, which sent us back under the saw, allen wrench in hand.

If you want to be really picky, you can check the 45-degree stop in a similar way. Crank the blade over until it comes to the 45-degree stop, then cut another block. Flip one piece, and the two pieces should fit together to form an exact right angle, like a picture frame. Check the cut's accuracy with your combination square.

3 Are the Table Extensions Level With the Saw Table?

To check, just lay a level or any other straightedge across the saw table and table extension as shown, at both the front and back of the table. Adjust the bolts holding the extension to the table if there's any misalignment, or use thin metal shims between the edge of the table and the extension to adjust for any tilt in the extension. Strips cut from aluminum cans make good shims.



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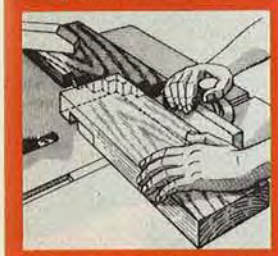

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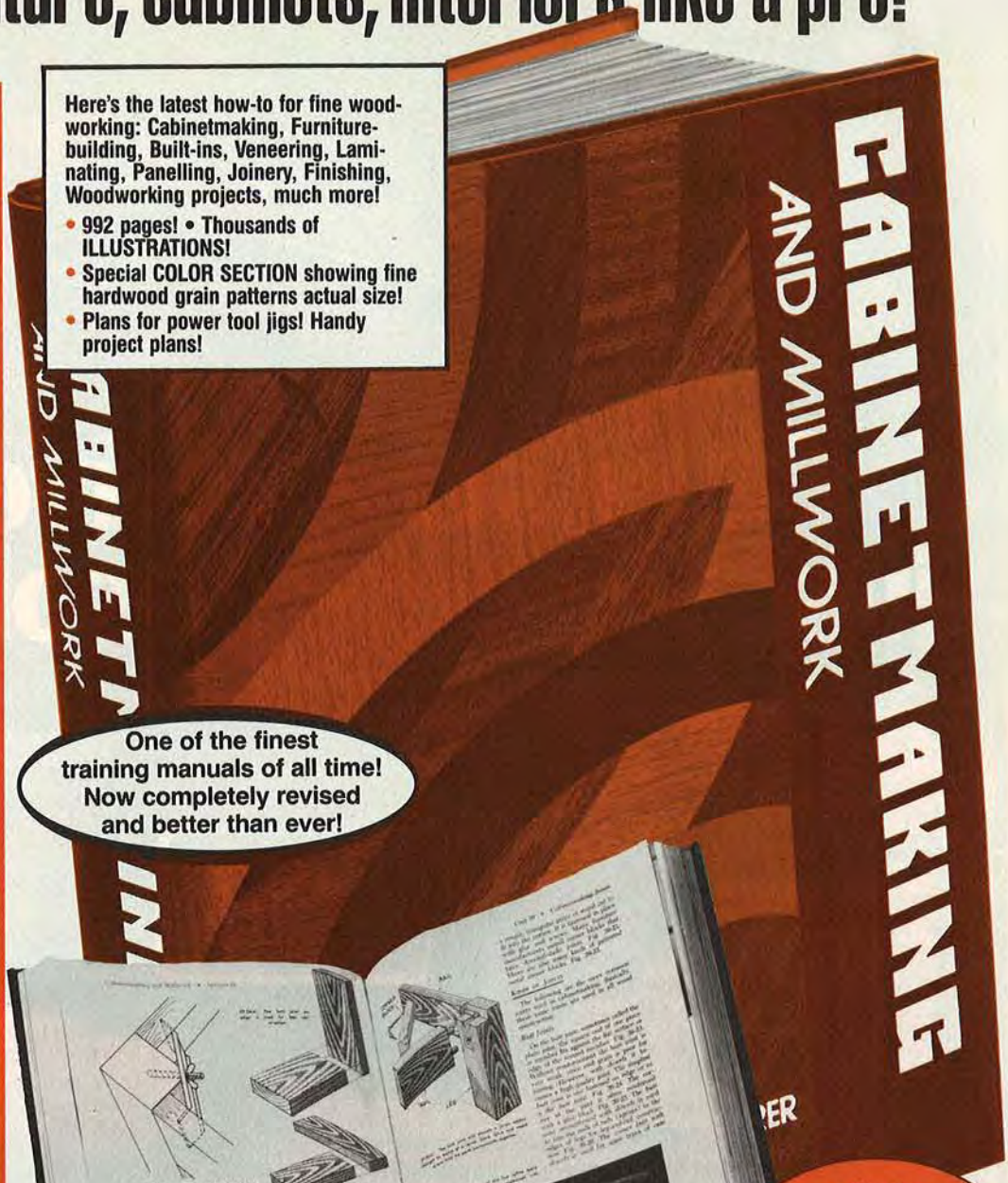

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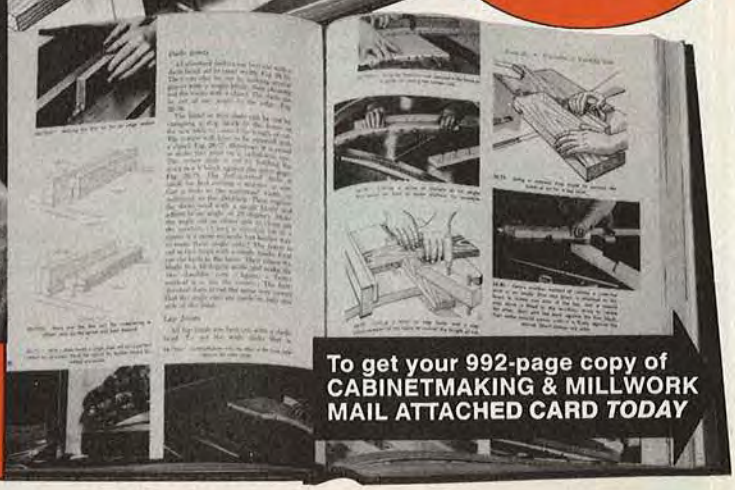

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GET THE MOST FROM YOUR TOOLS

Continued from page 10

tune up your table saw

4 Is the Rip Fence Parallel to the Saw Blade?

Your rip fence should slide easily along the guide rails at the front and back of the saw table, and lock into position parallel to the saw blade. Unfortunately, most fences don't align correctly. If yours doesn't, you're in for sloppy rip cuts and excessive wear on the saw blade. The easiest way to check is to slide the fence so it lines up with one of the miter gauge grooves in the saw table. Don't lock it. If it isn't parallel with the groove, it isn't parallel with the blade. To fix it, loosen the nuts that fasten the fence to the fence head (see top photo), adjust the fence parallel with the groove, and retighten the nuts.

Now, with the fence still unlocked, spring the rear end of the fence a bit out of alignment. If it doesn't spring back parallel, you'll have to adjust the tensioning device in the fence head, if there is one. On our Craftsman saw, a spring clip under the head (see bottom photo) adjusts with a couple of screws to keep the fence aligned when moved, while still allowing the head to slide easily along the rails.

Unfortunately, try as we might, we couldn't adjust the spring clip tension to get the fence to come back dead parallel every time. So, we check each setting by measuring from a miter gauge slot to the fence at the front and back of the table.

5 Make Sure the Fence Clears the Tabletop.

Ideally, the rip fence should clear the saw table by about 1/32 inch as it slides back and forth. Fold up eight thicknesses of newspaper into a long strip and lay them under the fence. Loosen the bolts holding the rails that the saw fence slides along at the front and back of the saw as shown here, then move the rails up

Continued on page 19

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Continued from page 17

tune up your table saw

or down until the paper will just slide out from under the fence

when it's locked in place. To make sure the rails are level, check for proper spacing with the fence near the saw blade and again with the fence near the edge of the table.

6 Is the Miter Gauge at Right Angles to the Saw Blade?

This check is easy, but important for precise crosscutting. Just lay a square against the saw blade (see below). Be sure to rotate the blade so the square goes between the saw teeth. A framing square works best.

If the gauge is out of square, loosen the screws holding the tongue to the head, adjust for square, then retighten the screws. You should also adjust the pointer on the gauge so it reads zero or

ninety degrees, depending on how your miter gauge is marked.

7 Is the Reever Aligned With the Saw Blade?

If you use a guard and reever or splitter on your saw (and, of course, you should), check to make sure the reever is aligned properly with the blade and parallel to it. Crank the blade all the way up, then lay a straightedge along the blade, extending out past the reever as shown. Do this on both sides of the blade. If the antikickback pawls

Continued on page 20

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GET THE MOST FROM YOUR TOOLS

Continued from page 19

get in the way, hold them up with a nail across the top of the reever. The object is to get the reever in the center of the blade so the reever will always ride in the center of the kerf you're cutting. Adjust the reever alignment by loosening the screws or bolts that hold it to the blade guard arm.

8 Wax the Saw Table and Clean the Blade.

A good coat of paste wax will help keep the saw table from rusting and help the work slide smoothly over the table. Rub a candle stub in the miter grooves as well so the miter gauge will slide through as smooth as silk.

Cleaning the pitch and other gunk off your saw blades will help them cut smoother and lessen heat buildup. You can soak them overnight in kerosene, or use liquid pitch remover. We used a can of gum and pitch remover from Sears, which worked quite well. A little scrubbing with an old toothbrush does the trick in minutes. Make a shallow tray from aluminum foil so the blade remains wet during the cleanup. ■

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While no one likes to think about them, shop accidents happen. And you should know what to do if they occur. Here's some common practices for typical mishaps.

Every shop, no matter its size, needs a first-aid kit to handle medical emergencies—from a splinter to a cut. You'll find two general types of pre-assembled kits available in a variety of sizes at most drugstores. *Unit-type kits* contain dressings, ointments, and other needs packaged in one-treatment units of from 16 to 32 in quantity. *Cabinet-type kits*, on the other hand, have the same items, but they are packaged in quantities for more than one treatment, such as a box of pressure dressings rather than one.

The following first-aid procedures were developed and are advocated by the American Red Cross. You'll want to remember them if a mishap occurs.

Scrapes, Cuts, and Punctures

STEP 1: Stop the bleeding by holding a sterile gauze dressing (or clean cloth) over the wound. If necessary, add more layers but don't remove the first one. Elevate the wounded part of the body above the heart; gravity should help slow down the bleeding.

(Note: Shock impairs your ability to think clearly. If the bleeding or the wound is more severe than you have coped with in the past, don't hesitate to call for help.)

STEP 2. After bleeding is controlled, wash your hands. Then wash in and around the wound. Rinse thoroughly. Dry the wound by blotting gently with a sterile gauze pad or clean cloth. Cover with a sterile dressing.

Watch carefully for signs of infection over the next few days (see sidebar). Consult your doctor about the need for a tetanus shot.

Splinters

STEP 1. Remove splinters in surface tissue with tweezers sterilized in boiling water or over an open flame.

Continued

SHOP SAFETY

first aid for the shop

STEP 2. Splinters just below the skin are worked out with the tip of a sterilized needle, then removed with a tweezers. Keep an eye on the area for infection. Often, a small broken-off piece will cause the area to fester. If it is too deep to work out, consult a doctor.

Blisters

STEP 1. Small blisters are best left unbroken. If the pressure does not fade, however, wash the area with soap and water, then use a sterilized needle to make a small hole at the base of the blister and drain.

STEP 2. Apply a sterile dressing to protect the area from further irritation. Watch for infection.

Eye Injury — Penetrating Object

STEP 1. If a splinter or other object penetrates the eye area, do not attempt to remove the object or to wash the eye. Call for help.

STEP 2. Cover both eyes loosely with a clean dressing. (Both eyes must be covered so the injured eye does not move.)

STEP 3. Stay calm and call a doctor or hospital for instructions.

Poisons — Swallowing

If you believe someone has swallowed a poison such as paint remover, stain, or varnish call the local poison control center or your doctor immediately. Check container label for ingredients.

Poisons — Splashing in Eyes or on Skin

STEP 1. For the eyes, pour lukewarm water gently into the affected eye, directing it *away from the other eye.* Continue flushing from two to three inches above the eye for five minutes.

For the skin, remove all clothing around the area and flush with generous amounts of water for several minutes.

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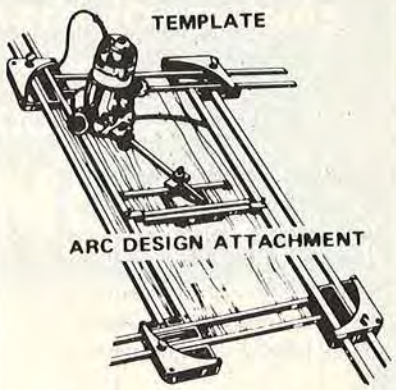

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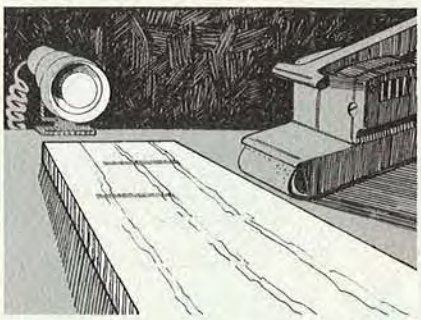
Des Moines, IA 50336

Print this article

Spotting sanding gouges

When smoothing a surface with a belt sander, it's difficult to tell if you've gouged the wood by moving the sander back and forth.

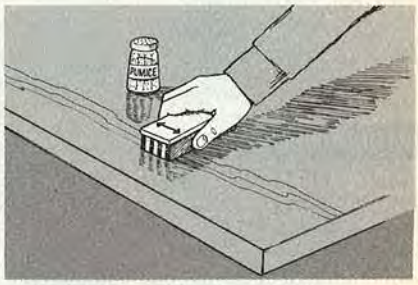
TIP: Clamp a small portable light to your work surface so that it illuminates the piece being sanded from a low angle. By sighting along the light, you'll be able to spot even the slightest dip (it will show up as a shadow among the highlights).



Handy abrasive container

Abrasives such as pumice and rottenstone create a mess when applied. It's also hard to find just the right applicator for rubbing out a finish with these materials.

TIP: An old pair of salt and pepper shakers from the kitchen make good storage containers. When ready to use, just shake the abrasive onto the surface to be worked. Use a felt chalkboard eraser or piece of dense foam typewriter pad to rub out the finish.



Continued on page 26

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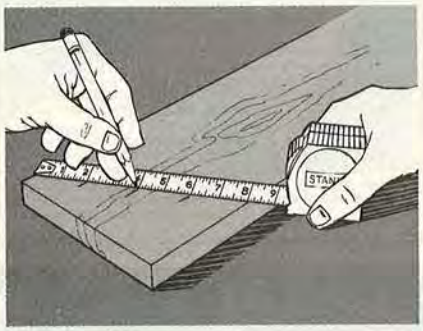
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 25

Laying out equal parts

Ever wondered how to quickly divide and mark a board into equal parts without lots of mathematical calculations?

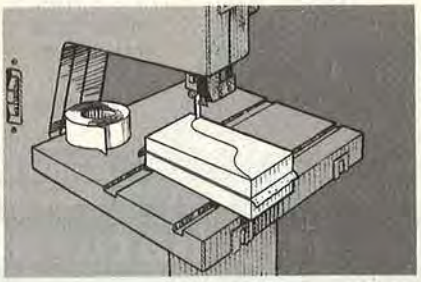
TIP: Lay a measuring tape or rule diagonally across the stock. Then, adjust the angle until the near edge of the board aligns with an inch designation that's divisible by the number of parts you want. The example shown divides the board into 4 equal parts. If you want 3 parts, you'd want the 9 on the board's edge.



Pairing project pieces

Cutting exact duplicates can be difficult. If you use nails to join the pieces, there are holes to fill. With staples, it's necessary to re-staple the parts as wood is sawn away.

TIP: Carbon copies won't slip apart when sawing if you use double-faced carpet tape to join them. Make your layout on the top piece of stock, then apply the tape to its back side. Remove the protective strip from the tape and firmly press the pieces together in alignment. Don't worry about tape placement between the blocks, as the saw blade won't be hindered.



Quick sandpaper cutter

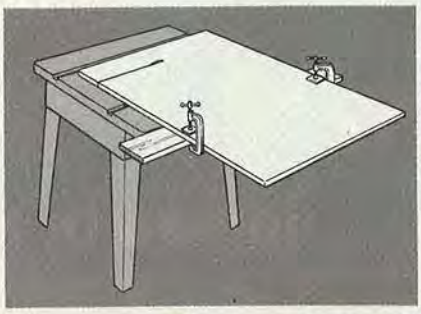
How can I divide full sheets of sandpaper into the sizes I use without folding, creasing, and back-creasing, then tearing on a straightedge?

TIP: Fashion a fast-and-easy sandpaper ripper with a scrap piece of plywood and an old hacksaw blade. Measure and mark the sizes of paper you normally use out of a full sheet on the plywood surface. With wood screws, mount the blade across the centerline. Use thin washers below the blade so the paper can slide under.

Large trim guide

Often, to trim a large piece of material, you have to remove the rip fence, but then you have the problem of keeping a true edge while running the piece through the table saw.

TIP: Use the saw-table edge as a guide. Clamp a 1×6 to the underside of the material the appropriate distance away from, and parallel to, the intended cutoff line. Then, run it through the saw, using the 1×6 as your fence. Use this technique to straighten an uneven edge, too.



Continued on page 28

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TIPS FROM YOUR SHOP (AND OURS)

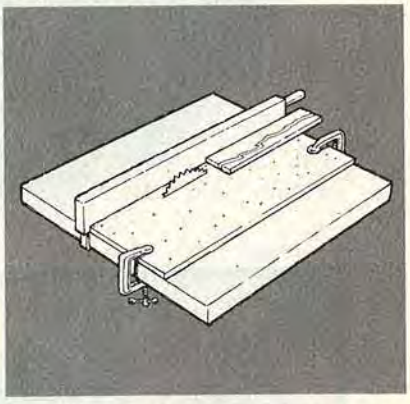
Continued from page 26

Handy lubricant storage

When driving a nail the wood often splits. (Without drilling pilot holes, screws may split wood, too.)

TIP: Coat nails with beeswax or paraffin before nailing. Rubbing lubricant into the threads of wood screws makes them easier to set, also. Keep lubricant handy by storing it in a ⅜" diameter×¾" deep hole drilled in the hammer handle. Melt beeswax or paraffin on a stove, then pour it into the hole to make it stay in place.

Zero-clearance blade slot



Narrow stock is pulled into your table saw's insert during ripping, and extra thin pieces chatter and splinter.

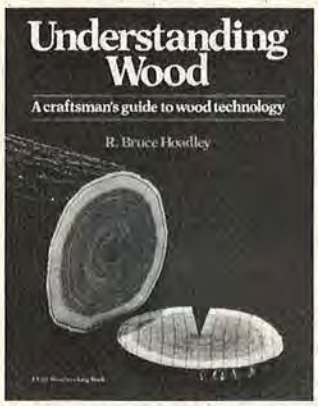
TIP: With the table saw blade in the fully lowered position, clamp a hardboard piece firmly to the saw top. Turn the saw on and very slowly raise the blade to working height. After it has cut its way through the hardboard, the saw blade will have zero clearance. The hardboard also serves to support thin stock to eliminate clatter.

Continued on page 114

BOOKS WORTH READING

Understanding Wood

By R. Bruce Hoadley. The Taunton Press, Inc., 52 Church Hill Rd., Box 355, Newtown, CT 06470. 1980.



256 pages
$19.95

Print this article

"Understanding cell structure is the key to appreciating what happens when wood is sanded across the grain, or why stain penetrates unevenly, or why adhesives bleed through some veneers but not others," says wood technologist Hoadley in a typical passage from this book. Its subtitle, *A craftsman's guide to wood technology*, underlines the author's main purpose, which is to translate and interpret the wealth of knowledge wood scientists have accumulated so the woodworker can better understand the material with which he works.

After reading what Hoadley says about the nature of wood, its cellular structure, the relationship between wood and water, how drying changes the physical dimensions of wood, and how different kinds of tension or pressure cause varying types of failure in wood, it's obvious he knows his subject. That same expertise is apparent as he explains how wood responds to cuts at different angles, how to prepare surfaces for finishing, and ways to bend solid wood.

Hoadley draws from more than 30 years' experience as a wood technologist in this interesting book. Sometimes, he lapses into using the technical jargon of his specialized field, but overall he does a very effective job of translating scientific information for the layman. This is an excellent value and important reading for anyone who is serious about understanding the really fascinating aspects of wood. ■

"While most woodworkers accept the idea of installing wood screws in prebored holes to prevent splitting and to maximize holding power, they seldom consider preboring nail holes. Pilot holes ranging from 60% of nail shank diameter for low-density woods to 85% of shank diameter for high-density woods give maximum withdrawal resistance."

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BOOKS WORTH READING

Wildlife in Wood

By Richard LeMaster. Contemporary Books, Inc., 180 N. Michigan Ave., Chicago, IL 60601. 1978

248 pages.
$35.00

When a friend asked professional model builder Richard LeMaster to carve a decoy for him, LeMaster thought it would hardly be a challenge. While he had a notion of what a duck looks like, LeMaster, to his surprise, couldn't find suitable photos or drawings for reference. To solve this problem, he bought some live ducks, including wild species, to get an intensive look at his subject. This in turn led him to develop techniques for photographing live birds.

Although *Wildlife in Wood* first appears to be a book on how to carve ducks, it in fact starts as a course in observing them. The author devotes the first 125 pages to these important preliminaries, including 24 pages of patterns. Then, it's on to the actual carving.

LeMaster encourages the reader to devise his own methods and invent his own tools rather than invest heavily in expensive items. "Start with a small sharp knife, a rasp, sandpaper, and some good clear wood," he says. To save time and make the chips really fly, he suggests adding a band saw, die grinders, power sanders, and flexible shaft machines.

By following his text, drawings, and photos, you quickly see wood blocks transformed into a roughed-out form and gradually into a detailed carving, precisely painted and finished as a lifelike replica. The intriguing quality of this book is the way LeMaster devotes so much attention to detail and still maintains a brisk pace and interesting, friendly tone. ■

"The majority of people who look at a completed carving invariably ask if it is carved from a single piece of wood. I have seen carvings made from one piece, but most carvings today are completed of layers, sections, or inlays. The only secret to piecing wood together is making sure the surfaces are flat so they can be glued and held together securely. The average carving is made from three separate chunks of wood—pieces to make the top, the bottom, and the head."

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BOOKS WORTH READING

Router Handbook

By Patrick Spielman. Sterling Publishing Co., Inc., Two Park Ave., New York, NY 10016. 1983.

224 pages
$9.95

If you've always thought of a router as a power tool for shaping edges and doing little else, this book will shed light on many applications you can use to add professional touches to your projects. Jobs such as making perfect-fitting joints (including dovetails), attractive wood signs, and decorative panels, he says, are a snap with a router—and some direction.

His book goes a long way in providing the necessary direction. Early chapters discuss available options in routers, bits, and accessories, along with the elementary routing skills, router care, and safety. Then, the author explains and shows how to make use of a router to do pattern routing, make joints and routed surfaces, rout freehand, carve signs, and use accessories that can make a router perform as a lathe, a jointer, a shaper, or a power machine for duplicating carvings in three dimensions.

This book is liberally illustrated with photos and drawings that clearly show what the author is discussing. Often, he explains how to make your own accessories, such as jigs, fixtures, and a router table, inexpensively.

Because Spielman writes in a clear, easy-to-understand manner about a subject he knows thoroughly from personal experience, he succeeds admirably. Whether you're a novice or a skilled woodworker, this reasonably priced paperback manual will be a valuable addition to your library. ■

"The capabilities of the router are now so extensive that whenever confronted with any woodcutting or shaping problem, I look to the router.

"The first portable electric router is believed to have been developed in Syracuse, New York by pattern-maker R. L. Carter, during World War I. His cutter (bit) was fashioned from the worm gear of an old electric barber's clipper. This cutter was attached directly to the shaft of an electric motor . . . Carter sold his business in 1929 to Stanley Electric Tools."

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690 1½ hp Router	179.00	134.
319 Tilt Base Trimmer	205.00	154.

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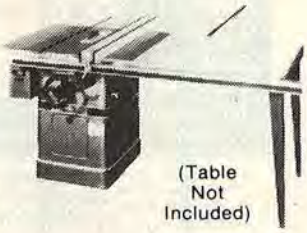

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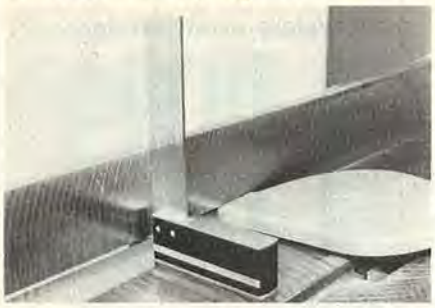
PRODUCTS THAT PERFORM

Gallery-class try square



Function and beauty can be combined, as in this brass and rosewood try square from Bridge City Tool Works. The TS-2 is guaranteed to be accurate to a tolerance of plus or minus .002" over its 8" blade, which is made of solid, ⅛"-thick brass. Both the blade and the handle have parallel sides square to each other inside and out. The handle is faced with solid brass wear plates. Construction is thoroughly heavy duty for such a beautiful tool. *TS-2 Try Square. Available mail order for $47, postage paid, from Bridge City Tool Works, Dept. W, 2834 NE. 39th Ave., Portland, OR 97212.*

Fine finishing abrasives

With grits ranging from slightly coarser than 600 grit sandpaper to one leaving scratches invisible to the unaided eye, Micro-mesh abrasive puts a mirror-like finish on any wood project. You start with the first of the nine grits and progress to the last. Use them wet or dry then wash and use again. Initially developed to polish scratched aircraft windshields, Micro-mesh systems are also available in metal polishing and acrylic plastic scratch-removal kits. *Micro-mesh Professional Woodworkers Kit. $29.95, postage paid, from Micro-mesh Specialties, Dept. W, 3714 W. 214th Pl., Matteson, IL 60443.*

Print this article

Sanding belt cleaner

Now you can extend the life of costly sanding belts with this simple cleaner. Either secure the Nu-Life cleaner in a vise or clamp it to a workbench, then sand it at normal speed. For stationary sanders, hold it against the abrasive belt or disk for a few seconds. Surprisingly, the material lasts a long time. Clean belts not only last longer but also prevent burning, chatter marks, and vibration. *Nu-Life Sanding Belt Cleaner. About $6 retail. From Abrasive Service Co., Inc., 398 Broad St., Forestville, CT 06010.*

Quick-locking "C" clamps

VISE-GRIP® adjustable double-lever action and quick release are now applied to the "C" clamp. They'll hold fragile items without crushing or clamp with power on heavy work. Jaw pads swivel for angles or access. In 6", 11", and 18" sizes. *Quick-Locking "C" Clamp. Available retail at $10.50 to $22.50. From Peterson Manufacturing Co., Inc., DeWitt, NE 68341.*

Continued on page 36

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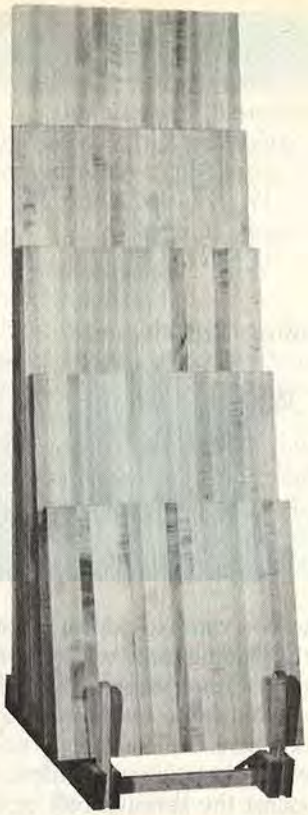

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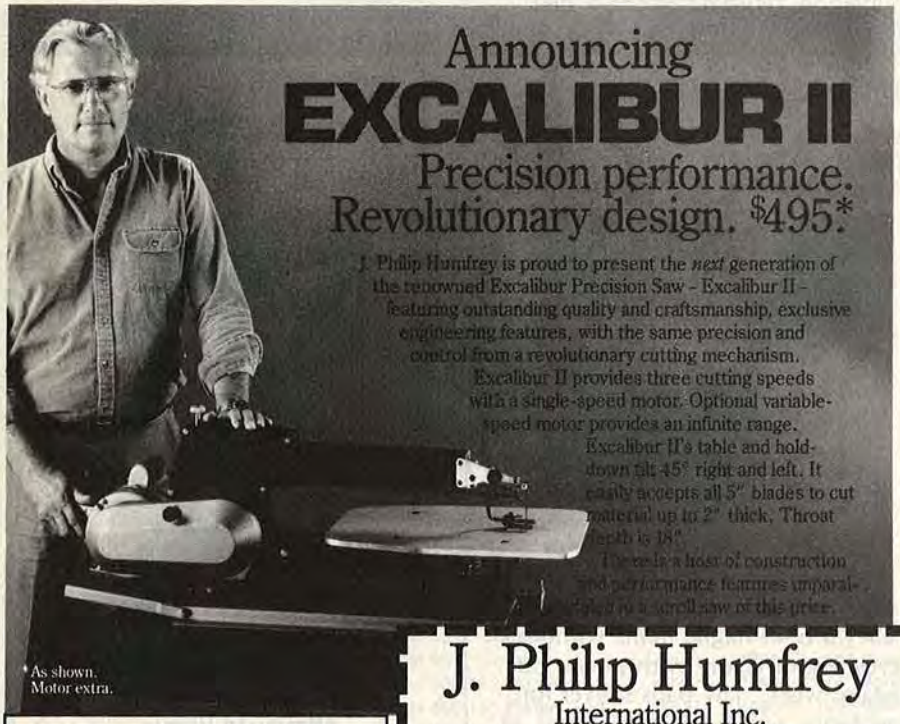
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PRODUCTS THAT PERFORM

Continued from page 35

Sleeveless drum sander

You can cut your own paper from 9"×11" sheets for these sanding drums. They'll fit on electric hand drills, presses, small motors, lathes, and anything else that develops at least 1,750 rpm. An eccentric locking device holds the paper in place. Sponge rubber backing prolongs paper life. *Drum Sander. $53.50 for set of four (diameters 1", 2", 2½", 3"×3" and ¼" or ½" adapters). Individual sizes can be purchased singly. Order direct from Singley Specialty Co., Inc., Dept. W, P.O. Box 5087, Greensboro, NC 27403.*

Versatile bench clamps

The Tru-Grip Back to Back Bench Clamp does away with C-clamps. Its bottom jaws clamp to your bench or other surface while the top jaws hold work. And the clamp jaws won't protrude above a ¾" board. Made of heavy-duty plastic, clamp jaws have a two-step locking action. The companion Clamp 'N Tool Guide works for edge-to-edge clamping or as an auxiliary fence and straightedge. *Tru-Grip Clamps. Retail, about $30 for Clamp 'N Tool Guide; $21 for 24" (18" grip) Back to Back, and $40 for 42" (36" grip) model. Griset Industries, Inc., P.O. Box 10114, Santa Ana, CA 92711.*

Continued

Precision wood threader

Use your router with the Beall Wood Threader to make smoother, more defined threads in hard or soft woods, even some plastics. It won't dull like a thread box because it uses special taps with precision ground pilots that assure perpendicular threads. The special router bit is a high-speed steel, double-ended, three flute, spiral-cutting 60-degree veiner. The threader relies upon the necessary high speed of the router, which clamps to the top of the unit and is positioned by an index sleeve, to cut threads. It's available in #6×1", #6×¾", and #8×½" thread sizes. *Beall Wood Threader. $129 for kit of three sizes; single size kits available. Sent postage paid from the Beall Tool Co., Dept. W, 541 Swan's Rd. NE., Newark, OH 43055.*

Handsome hardworking bench

Crafted by woodworkers for woodworkers, the Eurobench Model 290 is made to last. Top is face-laminated, kiln-dried southern oak with square dog holes. Base is of other hardwoods. The work surface measures 70"×30" and is 2⅛" thick with 3" edge banding. It comes finely sanded and includes all assembly hardware. Just add an oil or other finish to complete. Options include a 12" custom vise (shown) and a metal machinist's table. Extra storage bins, mallets, and transverse base beams also available. *Eurobench. $144 plus freight. Vise, $39.50; Machinist's table, $44. Order direct from Tennessee Hardwood Co., P.O. Drawer 220, Dept. W, Woodbury, TN 37190.*

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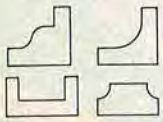

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SOUND ADVICE

tips for controlling shop noise

Unless you work in a soundproof booth, noise from a table saw or power hand tools can get on others' nerves. Excessive shop noise is also tiring. It may cause you to do less than your best and possibly ignore basic safety rules. Use these tips to quiet your work place.

- Replace hollow-core workshop doors with solid wooden ones.
- Unless you need the air space for ventilation, weatherstrip around and under doors.
- Rough-in walls around an open workshop, and use fiberglass batting between studs to trap noise. Use heavier ⅝" wallboard or plywood rather than thinner panels.
- Apply latex caulk or acoustical sealant around wall outlets, behind molding, and at the top and bottom of wall panels to seal out noise.
- Perforated acoustical ceiling tile has tiny air pockets that serve as sound deadeners. Use it on the ceiling and back with fiberglass insulation. You can use tile on walls, too, but plan to vacuum sawdust frequently to preserve the material's sound absorbing qualities.
- First- or second-story shops can be quieted by hanging framed acoustical panels (or even styrofoam board) on walls.
- Rubber mats under workbench tools muffle sound, and so do cork and felt.
- Fit equipment mounting bolts with rubber or neoprene hose. Cushion bolt heads and nuts with rubber washers.
- Guard your own hearing with earplugs or headphone style ear protectors. ■

BUILD YOUR OWN Router Table

Now you can get the most out of your router by mounting it to this shop-tested router table.

The first time you try this shop-tested router table, you'll agree it adds a whole new dimension to what a router can do for you.

The *Woodsmith* router table is designed to fit any router, and has features you'd expect only on professional models.

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The extra-large table provides a steady work surface for both large and small pieces. It also has a fully-adjustable fence that lets you make cuts exactly where you want them. And with the router mounted under the table, you can easily make molding cuts on narrow or curved boards, or make multiple cuts for special effects.

Send for exclusive step-by-step plans.

The plans for this router table are now available in a six-page plan booklet that shows how easy it is to build a full-size floor model with storage cabinet (shown in photo), or a portable bench-top model.

For a limited time, the Router Table plan booklet is only $1. Send to: *Woodsmith* Dept. 59, Box 842, Des Moines, Iowa 50304.

Woodsmith® PLAN BOOKLET

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3103	2 Sp. Cut Sawkit	99.95
3105	Var. Sp. Cut Sawkit	109.50
3107	Var. Sp. Orbital Cut Sawkit	119.50
3123	Port. Band Sawkit	305.00
3141	Cordless Jigsaw w/98060 Charger	149.95
3157-10	Var. Sp. Jigsaw	129.50
3265	Laminate Trimmer	145.65
3310	1½ H.P. Router	139.50
3330	1 H.P. Router	99.95
3370-10	3¼" Planer	129.95
4010	Palm Sander	48.95
4018	½ Sheet Sander	99.50
4247	4½" Disc Sander/Grinder	69.95
4260	Power File	189.50
6750	Heat Gun	69.75

Watco Danish Oil

Natural, Medium, Dark, Black or Colors

$5.70 Qt. $17.65 Gal

TITEBOND WOOD GLUE

$5.75 Qt. $12.95 Gal

HITACHI TOOLS

B600-A	14½" Band Saw	$1554.00
CJ65VA	Electronic Jigsaw	132.75
CR10V	Reciprocating Saw	124.75
C10FA	10" Miter Saw	279.00
DRC-10	Cordless Screwdriver	98.50
DR-10	⅜" Drill/Screwdriver	108.00
D6V	¼" Var Sp Rev Drill	71.00
D10V	⅜" Var Sp Rev Drill	74.95
D13V	½" Var. Sp. Rev. Drill	99.75
F-20A	3¼" Planer	99.75
F1000A	Planer/Jointer	1375.00
JH-60A	Jig Saw	103.50
P50	6⅝" Planer	210.00
P100F	12" Planer	1095.00
PSM-7	7¼" Circular Saw	114.95
PSM8	8" Circular Saw	141.90
SB-110	4x24 Belt Sander w/dust bag	183.00
SO-110A	½ Sheet Sander w/dust bag	119.95
SB-75	3x21 Belt sander-2 Sp. w/dust bag	134.75
SB8T	3x24 Belt sander 2-Sp w/dust bag	149.95
TR-6	Laminate Trimmer	92.25
TR-8	1 H.P. Plunge Router	126.95
TR-12	3 H.P. Plunge Router	194.75
W6V	Screwdriver	94.50

SUNGOLD X-WEIGHT SANDING BELTS

Sold in packs Outlasts regular belts 2 to 1

Size	Grit	10 Belts		
3"x21"	120	100	$.98 ea	$.84 ea
Assortment of 10 $15.95	80	1.00 ea	.86 ea	
	60	1.05 ea	.92 ea	
	50	1.07 ea	.94 ea	
	40	1.10 ea	.96 ea	
3"x24"	120	100	1.20 ea	.93 ea
Assortment of 10 16.95	80	1.22 ea	.97 ea	
	60	1.26 ea	1.12 ea	
	50	1.31 ea	1.15 ea	
	40	1.34 ea	1.18 ea	
4"x24"	120	100	1.68 ea	1.46 ea
Assortment of 10 21.95	80	1.73 ea	1.51 ea	
	60	1.78 ea	1.64 ea	
	50	1.85 ea	1.70 ea	
	40	1.89 ea	1.76 ea	

Makita Table Saw 2708 $249.00

Free Stand!

Makita Drill (6010D) Charger & Vacuum Cleaner

Makita 12" Planer-Jointer 2030 $1399.00

DK1001 $129.95

Hitachi 14½" Bandsaw B-600A $ 1554.00

Hitachi Planer-Jointer F1000A $1375.00

Makita Planer 2040 15-5/8" $1295.00

Free Stand!

NEW SALE ITEMS!

MILWAUKEE & ROCKWELL

BLACK & DECKER MAIL IN REBATES

Model	List	Our Price	Rebate	Your Cost
1179 ⅜" Drill	113.00	69.95	10.00	59.95
1180 ⅜" Drill	144.00	99.95	10.00	89.95
1575 ⅜" Scrugun	169.00	119.50	10.00	109.50
3030 7¼"Circ	155.00	119.95	10.00	109.95
3051 7¼" Wormdrive	232.00	158.25	20.00	138.25
3103 Cut Saw	163.00	99.95	10.00	89.95
3105 Cut Saw	170.00	109.50	10.00	99.50
3107 Cut Saw	183.00	119.50	10.00	109.50
4010 Palm Sander	80.00	48.95	10.00	38.95
4247 Disc Grinder	102.00	69.95	10.00	59.95

NEW!

IT'S BACK!

Makita ½" 3 H.P. Plunge Router $119.95 3612BR $189.95

Makita 16" Circular Saw $395.00 5402A $395.00

Blade Sharpener Blade Holder **$39.95**

NEW!

NEW!

Makita Palm Sander B04510 $46.95

Makita 6" Round Palm Sander BO4530 $52.95

Makita 8¼" Circular Saw 5008NB $105.00

heirloom toys

Crafted collectors' items from the basement toy company of Steve Baldwin

Print this article

The son of a career Navy man, Steve Baldwin was born in New London, CT. When his father retired in Omaha, Steve enrolled in the public schools' industrial arts program. He's been hooked on woodworking ever since.

Pursuing his crafting skills to the University of Nebraska, Steve received a B.A. degree in Industrial Arts, then completed a graduate program in counseling.

At 36, Steve is a full-time junior high counselor. His 20 years of woodworking experience is focused on the products of the Baldwin Toy Company, which he designs and crafts in his home workshop.

During the summer, Steve and his wife, Pam, travel to art and craft fairs marketing his toys.

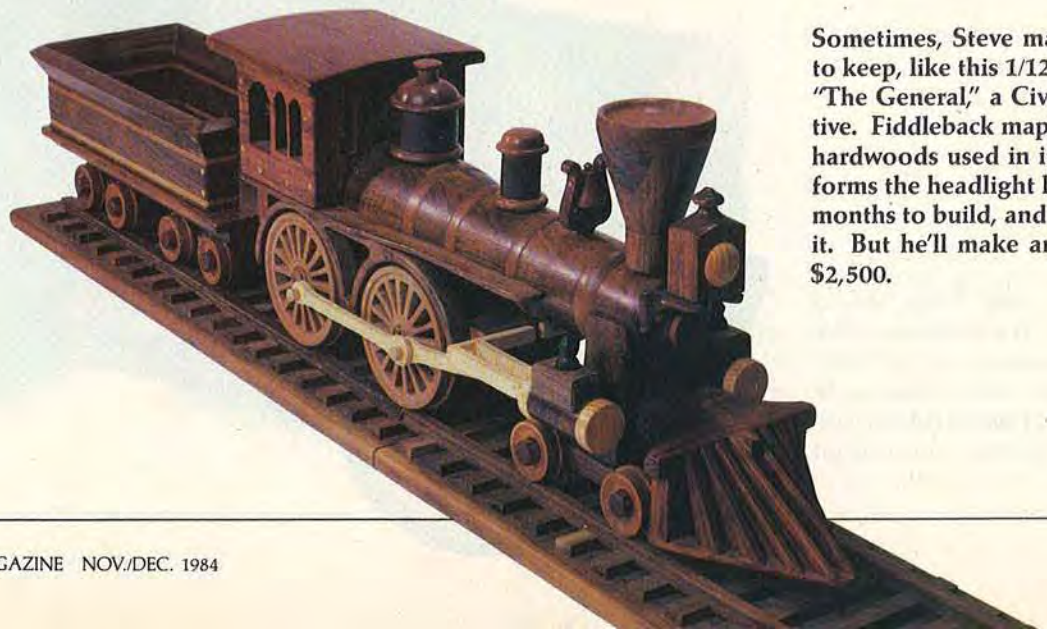
Steve Baldwin makes little wooden toys. And people pay big money for them. That's because they're more than toys to Steve, and to the folks who buy them.

The products of his Omaha-based Baldwin Toy Company are individually crafted of hardwood and range from miniature size to the Collectors' Series, which includes a semi and flatbed with cargo that's 54 inches long. They're made in combinations of cherry, maple, walnut, oak, ebony, and other exotic woods and can bring as much as $3,000. Crafted as heirlooms, Steve's toys are meant to be passed on from generation to generation.

Why do people pay $130 for his MG, a popular model, or $275 for the Deluxe Two Door with rumble seat?

"It's the appreciation of wood," Steve says. "Modern furniture is all particleboard and veneer, manufactured, and slick. Cars don't even have chrome anymore—they're all plastic. People still marvel at a 1952 dashboard that has some metal, some chrome. It's the same way with wood. It's got a charisma about it. It's universal."

A good portion of his customers, he believes, represent the baby boom of the Fifties who now want, and can afford, some luxuries. He feels they want



Sometimes, Steve makes things just to keep, like this 1/12 scale model of "The General," a Civil War locomotive. Fiddleback maple, one of seven hardwoods used in its construction, forms the headlight lens. It took six months to build, and Steve won't sell it. But he'll make another one, for $2,500.

Continued

quality and will pay for it.

Steve also believes his toys are a little different from those made by others, since all his large ones and many of the midsize pieces come apart, puzzle-fashion.

"There are lots of other people building toys, but these are my design. They fit my style. You have to blend your theme and your skills, then that's your original. All the different woods are a nice touch people like. That sets my work apart," he explains.

There's another special touch. Each model in the Collectors' Series is guaranteed for life. No one has yet collected on his guarantee, he says, because of the way the toys are treated. "It's intended to stay in the family as a carpet toy. I stamp the family name on the back and give it to them. They take it down (from the mantel) only as a special toy, and it'll be passed on."

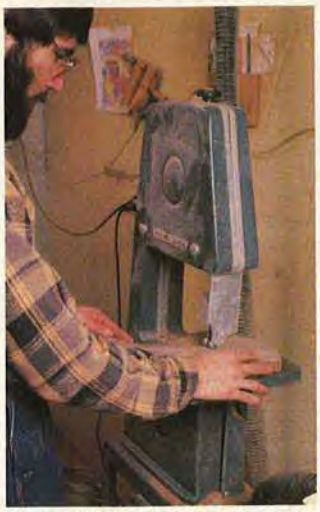
Each Collectors' Series car also bears a registration card that tells the buyer about the guarantee and the care requirements, as well as the different woods used in construction. The card number corresponds to one stamped on the front of the toy. Steve files the card and the buyer's name on return, then uses the list to mail a semiannual newsletter to close customers.

Good Craftsmen Build Around Their Tools

Production in Steve's basement workshop revolves around a band saw, backed up by a table saw, a lathe, a drill press, and lots of sanding equipment. With his experience, he knows what his tools can do, and designs his toys within their limitations. A woodworker who doesn't know what his tools can do, he believes, will be in for a lot more work.

"There might be ten ways to approach the same thing," says Steve, "and you have to know all those so you can adjust accordingly. Sometimes, the best way to learn is to duplicate what someone else has thought out, then start perfecting along the way to fit your equipment and needs. My prerequisite has always been the tools I had. If a project didn't fit, I redesigned it."

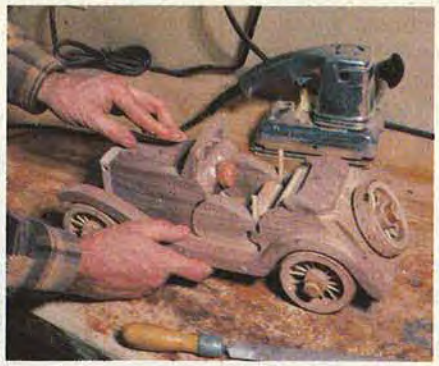
Upgrading, though, is part of growing, and Steve has had to do it. First, a heavier-duty table saw to cut



hardwoods. Then a larger drill press with greater spindle depth for more working surface.

He's presently producing about 100 large vehicles a year, and sets up for that. But he's made as many as 300, which he estimates is nearing full-time production. To do any more would require farming out the sanding, and he's not ready for that. Steve thinks he'll be ready to become a full-time woodworker at age 55. For now,

This 18-wheeler and cargo would bring raves at truck stops. The tractor cab measures 11"×8"×23", and total length with trailer is 36 inches. Atop the flatbed rides a Collectors' Series "4 Door" constructed puzzle-fashion.



Puzzling toys makes them more interesting to the buyer. In production, pieces are easier to finish. After sanding, Steve applies Danish oil, which is nontoxic when thoroughly dry. This MG has twelve parts.

though, he's content spending 20 hours a week in the shop and the rest of his free time with his family. Full-time toymaking would mean traveling the nation marketing his work, with little time at home.

A Concept Based On Production

The line of toys Steve builds in his basement is extensive. When he adds to it, it's not done by chance:

"Lots of times, when I'm looking at something to build, I'll ask myself, 'How would that look in wood and how would the woods blend?' My background in woodworking gives me confidence—it opens up new avenues. I can be creative because I'm not worried about technique or what the tool is designed for. I'm solely into the product."

Miniatures, the newest addition to his line, are done to save wood. With all types of scraps around from bigger projects, Steve decided to utilize them. He sells the tiny vehicles for $3.50 and doesn't have a whole lot of scraps around anymore.

His puzzle concept, though, came about almost by

Continued

accident. The first car he made was assembled with wood screws. Then he pinned the parts with dowels. "And then I thought," Steve recalls, "it's silly to glue it because it's easier to sand in parts. So I first offered the puzzle as an option. Pretty soon there wasn't an option —I just left them in parts. It was ease of production."

Many of the toys he makes won't adapt to the puzzle concept, either because of their shape or size. Others, now made solid, can be doweled to come apart, but it raises the cost about $10 and Steve has to decide whether or not it will sell with a higher price tag. And that's the test for his work, the marketplace.

"There are people doing some super stuff [in woodworking] out there, some exotic things, but they never sell it," he explains. "I've laid it on the line. My work is out there for judgment. It's for sale."

His toys are hot now, but will success spoil Steve Baldwin? "You can't be seduced into making more for less," he believes. "The public's pretty good. They want quality, and if you help educate them, they'll pay for it. Who's going to pay $130 for one of these toys until they understand it? That becomes my job. I'm selling them one at a time over 30 years rather than 3,000 a year. I'm building a following." ■

Bugatti racer from Baldwin Toy, top, and custom-order T-top Corvette handcarved of walnut.

Few scraps go to waste with the addition of miniatures to the line. Largest sells for $130, smallest for $3.50.

Photographs: David Jordan.

YOUR GUIDE
to picture-perfect miter joints

Photographs: Bob Calmer

The picture-perfect miter joint — is it possible to accomplish? We think so, and we're sure you'll agree with us after you master the easy-to-learn tricks and techniques we share with you on the following six pages.

Print this article

Lots of home hobbyists have a terrible time making accurate miter joints. Many a can of wood putty have been forced into the crevices between two "almost accurately cut" pieces of wood. While that's great for manufacturers of this product, it doesn't say much for the level of craftsmanship.

Actually, simple miter joints aren't any more difficult to make than an accurately done butt joint, for example. In fact, you can make any joint well if you follow the Golden Rules of Joint Making.

Rule 1 — Use a sharp saw or blade to make the cuts

Rule 2 — Set up your saw accurately

Rule 3 — Test the setup on scrap before cutting

Rule 4 — Learn how to compensate for the minor fitting problems you'll encounter

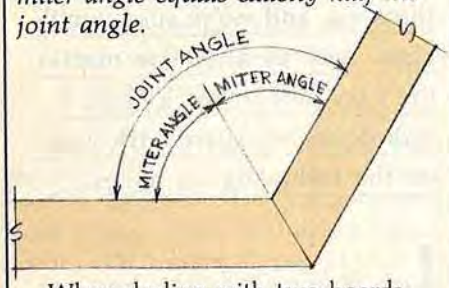
Note: In this issue, we restrict our comments to *simple* miter joints with splines. In subsequent issues, we'll tackle other types of miters, including the "mysterious" compound miter joint. (For more information on why we fortify our miter joints with splines, as well as a look at seven different splining options, see pages *49* and *50*.)

Continued

DETERMINE THE MITER ANGLE

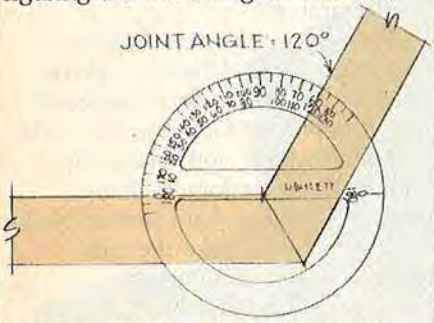
Though most people think of a miter joint as two boards meeting at a 90° angle, that needn't always be the case. That's why you must first determine the miter angle you're dealing with.

The sketch below shows that no matter what situation you're in, *the miter angle equals exactly half the joint angle.*



When dealing with two boards that meet at an angle, there are basically three ways to figure the miter angle.

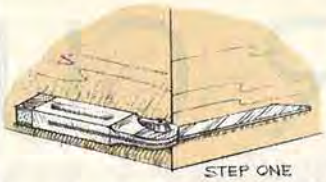
The sketch below shows a full-circle protractor (a handy workshop tool if you don't already have one) figuring the miter angle. This tool

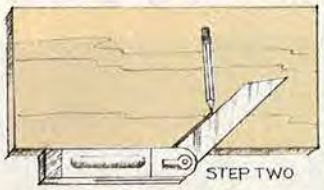


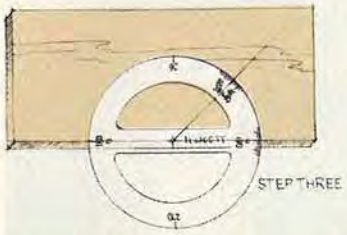
works well if you're dealing with a flat surface. You simply position the center point of the protractor at the joint line, with the scale at zero on one of the joining members. Read the joint angle as shown. The miter angle in this example is 60°.

On occasion, you'll need a sliding T-bevel to figure the angle (see the top sketch in the next column). Align the tool's pivot point with the joint and tighten the setscrew to record the angle. Draw the angle on a piece of paper or a flat surface, then measure with your protractor to get an exact reading in degrees. The miter angle would be half of the reading.

Here's a handy formula that







makes figuring the miter angle a snap in situations other than those described above.

The miter angle = 360° ÷ number of sides ÷ 2.

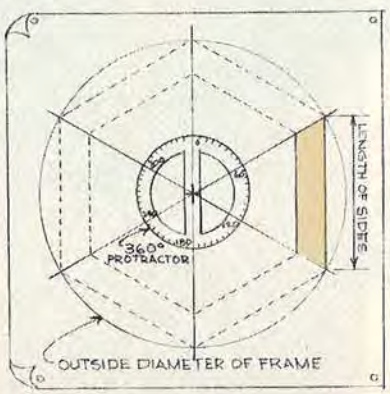
For example, in building a six-sided project, the miter angle would be 360° ÷ 6 ÷ 2 = 30°.

FIND THE LENGTH OF EACH PIECE

With squares and rectangles, you shouldn't have any trouble doing this. Just measure the lengths needed and begin your saw setup.

The plot thickens a bit when you're dealing with other geometric shapes. Fortunately, though, we've devised an easy way to figure length for these. The sketch below shows how it's done.

Start by scribing a circle (on scratch paper) that defines the outside perimeter of the item you want to make. Then, lay a full-circle protractor on the center point of the circle and make marks to divide the circle into the correct number of segments. Extend lines from the center point through your marks and on out to the perimeter. The distance from one intersection of lines and the perimeter to the next intersection equals the length of each piece.

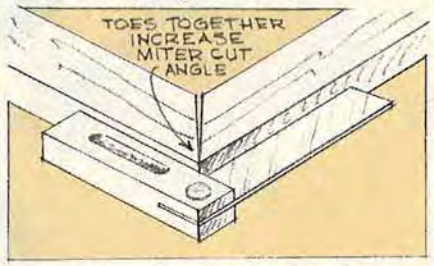


SET UP YOUR SAW — ACCURATELY

Consider yourself fortunate if you can move your saw to, say, 45°, and be dead on the money. Most equipment simply isn't that accurate. But, you have to start somewhere, so set your saw at the appropriate angle (the miter box we used in the photo below has positive stops at some of the more common angle settings).

MAKE YOUR TEST CUTS

Doing this will tell you a lot in a hurry. If you're making a square frame, for example, make a cut at one end of a pair of test scraps and then check the accuracy of the angle with a framing or try square. The sketch below shows what can occur if the angle isn't right on. If



the toes touch, you need to increase the angle of cut. But if the heels come together, decrease the angle slightly.

Repeat this process until the joining members meet perfectly. Though time-consuming, you'll find this chore beneficial in the end.

SET UP FOR LENGTH

Once you've verified the accuracy of the angle of cut, you can then turn your attention to ensuring the correct length of each member. How you do this varies depending on the type of project you're working on.

With projects such as picture frames and the like, we miter-cut one end of each of the pieces first, set up a length stop (see the photo below) and then cut the other end

of each piece. Length stops come in handy no matter what tool you're using to make your miter cuts. They sure beat trying to measure each piece separately.

Sometimes, when you're building a large project or dealing with long pieces of material, it's not possible to set up a length stop. In these situations, we cut one end of a piece, then measure very carefully, mark the cutoff line, and make the second cut. *When marking the cutoff line, be sure to indicate which side of the line you want the blade to be on when you make the second cut.*

DRY-FIT AND MAKE MINOR ADJUSTMENTS

By now, you should have a pretty good fit. To be sure, though, clamp the parts together. When we clamped the frame shown in the photo at the top of the next column, we detected a minor problem.

We scribed a line on one of the adjacent parts, then used a block

plane to remove the excess wood from the heel portion of the miter (see the photo below). If you use a

block plane, work from the heel edge toward the toe to avoid tear-out.

Disk sanders make quick work of minor irregularities, too (see the photo below). If you have one of

these tools, you'll probably want to go this route rather than using the much-slower block plane.

A MITER-CUTTING JIG FOR YOUR TABLE OR RADIAL ARM SAW

If you make lots of picture frames or other projects that utilize miter joints, do we have a jig for you! The sketch at the top of the next page shows how it goes together. The two adjustable miter fences pivot on 1" walnut dowels. By loosening the 2" walnut knob at the end of each fence, you can rotate the fences to any angle you wish. In one of the other sketches on the next page, we show you how to plot several commonly used angles on the jig's top surface for easy reference.

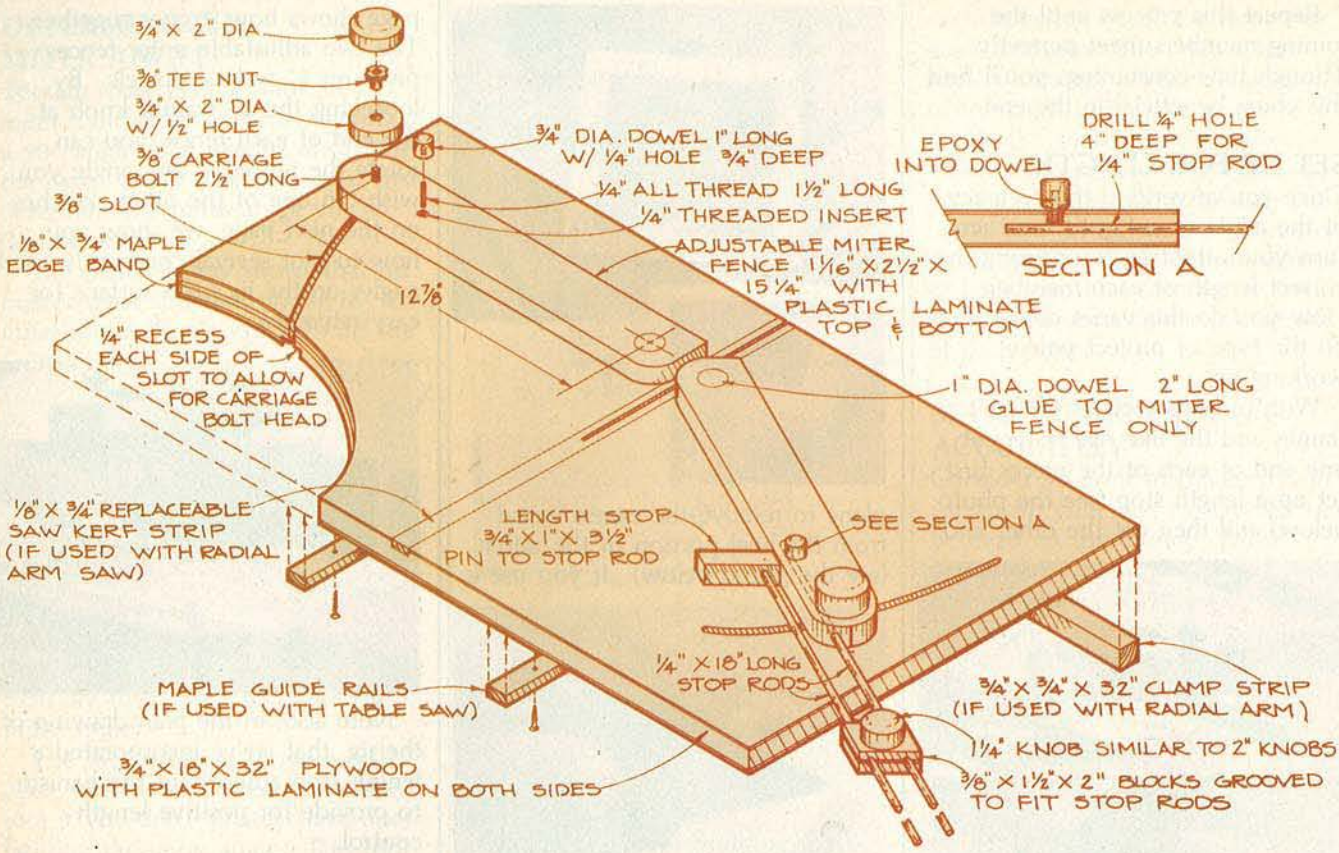
Note also, in the plan drawing of the jig, that we've incorporated a length stop adjustment mechanism to provide for positive length control.

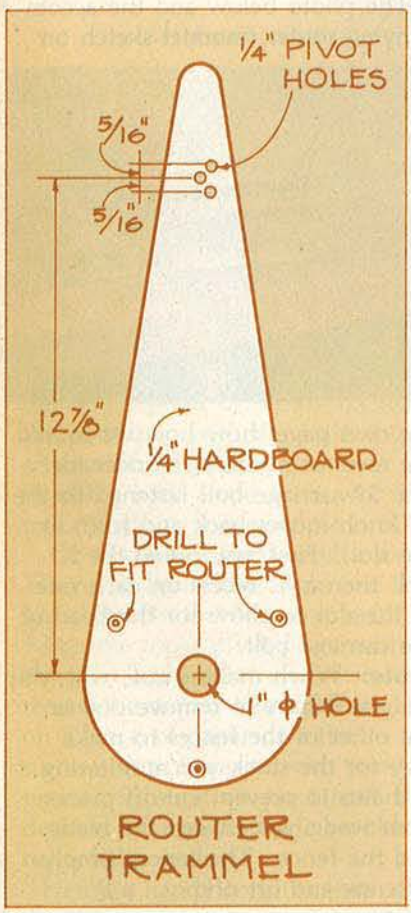
The photo below and the accompanying router trammel sketch on

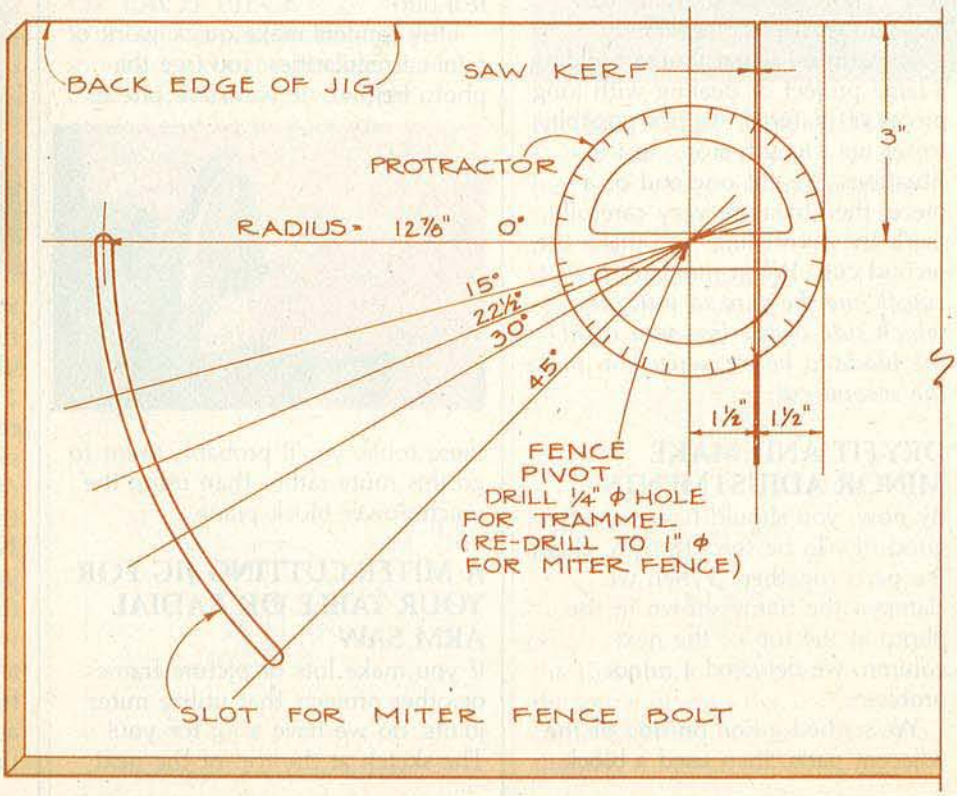
the next page show how we routed the recesses in the jig's underside (the ⅜" carriage bolt fastened to the 2" knob moves back and forth in the slot). First, we routed the ⅜" slot, then a ¼" recess on each side of the slot to allow for the head of the carriage bolt.

Note: When making cuts with this jig, you'll have to remove one or the other of the fences to make way for the stock you're mitering and also to prevent cut-off pieces from wedging between the blade and the fence. The fences simply unscrew and lift off.

Continued


3/4" X 2" DIA
3/8" TEE NUT
3/4" X 2" DIA. W/ 1/2" HOLE
3/8" CARRIAGE BOLT 2 1/2" LONG
3/8" SLOT
1/8" X 3/4" MAPLE EDGE BAND
12 7/8"
1/4" RECESS EACH SIDE OF SLOT TO ALLOW FOR CARRIAGE BOLT HEAD
3/4" DIA. DOWEL 1" LONG W/ 1/4" HOLE 3/4" DEEP
1/4" ALL THREAD 1 1/2" LONG
1/4" THREADED INSERT
ADJUSTABLE MITER FENCE 1 1/16" X 2 1/2" X 15 1/4" WITH PLASTIC LAMINATE TOP & BOTTOM
EPOXY INTO DOWEL
DRILL 1/4" HOLE 4" DEEP FOR 1/4" STOP ROD
SECTION A
1" DIA. DOWEL 2" LONG GLUE TO MITER FENCE ONLY
1/8" X 3/4" REPLACEABLE SAW KERF STRIP (IF USED WITH RADIAL ARM SAW)
LENGTH STOP 3/4" X 1" X 3 1/2" PIN TO STOP ROD
SEE SECTION A
1/4" X 18" LONG STOP RODS
MAPLE GUIDE RAILS (IF USED WITH TABLE SAW)
3/4" X 3/4" X 32" CLAMP STRIP (IF USED WITH RADIAL ARM)
1 1/4" KNOB SIMILAR TO 2" KNOBS
3/8" X 1 1/2" X 2" BLOCKS GROOVED TO FIT STOP RODS
3/4" X 18" X 32" PLYWOOD WITH PLASTIC LAMINATE ON BOTH SIDES

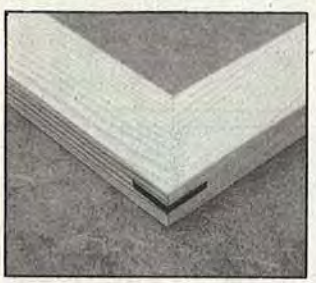

1/4" PIVOT HOLES
5/16"
5/16"
12 7/8"
1/4" HARDBOARD
DRILL TO FIT ROUTER
1" ϕ HOLE
ROUTER TRAMMEL


BACK EDGE OF JIG
SAW KERF
3"
PROTRACTOR
RADIUS = 12 7/8"
0°
15°
22 1/2°
30°
45°
1 1/2"
1 1/2"
FENCE PIVOT DRILL 1/4" ϕ HOLE FOR TRAMMEL (RE-DRILL TO 1" ϕ FOR MITER FENCE)
SLOT FOR MITER FENCE BOLT

SEVERAL WAYS TO REINFORCE YOUR MITER JOINTS

We like to strengthen our miter joints. And one of the best ways we've found to beef them up is with splines. Splines not only strengthen the joint by providing more surface area for the glue to adhere to, they also make it a great deal easier for you to glue and clamp your project. And some types of splines even make the joint more attractive.

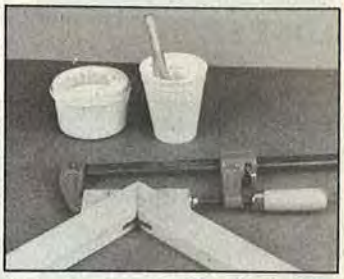
For your convenience, we've developed a visual chart showing seven different ways to strengthen your miter joints. In the first photo of each category, we show the finished joint. The three photos that follow show how to make it.



THROUGH SPLINE

Cutting groove with jig

Cutting spline material*

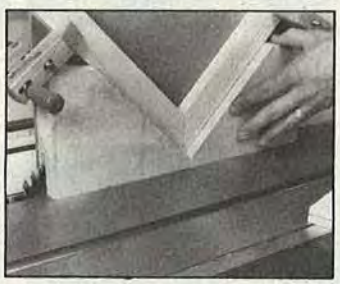


Clamping with glue blocks**

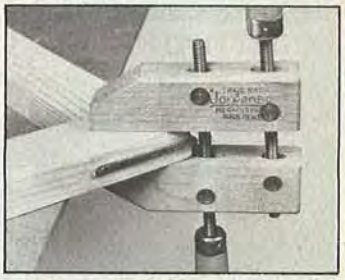
*For greatest strength, crosscut spline material **We use hot-melt glue to adhere blocks to the stock

FEATHER SPLINE

Joint glued and clamped

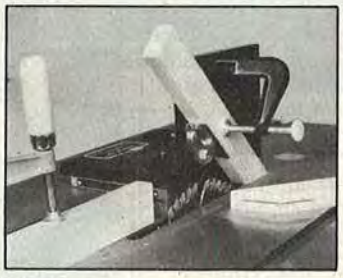


Cut groove with V-block jig



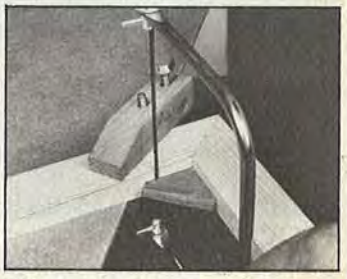
Spline inserted and clamped

CONCEALED SPLINE

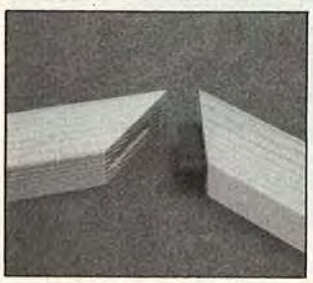


Cutting groove using stop block

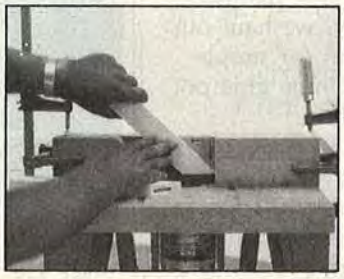
Shaping spline to fit groove



Trimming away excess spline



HIDDEN SPLINE



Cutting mortise with router*

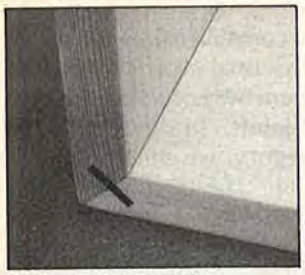
*Note sequence of cuts 1 and 2

Rounding ends of spline

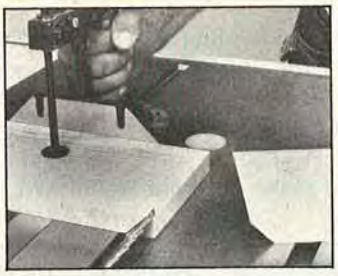
Spline in place; assembling joint

Continued

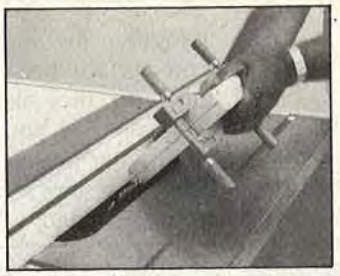
SHOP-TESTED TECHNIQUES



EDGE SPLINE



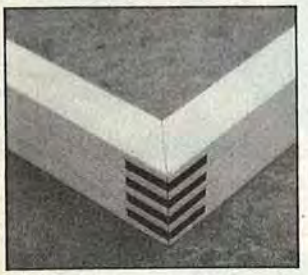
Cutting miters



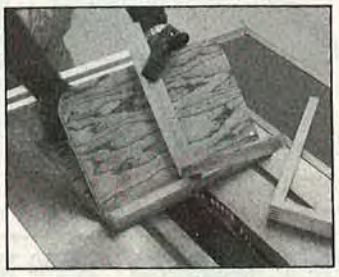
Paired parts being grooved*

Assembling joint with glue

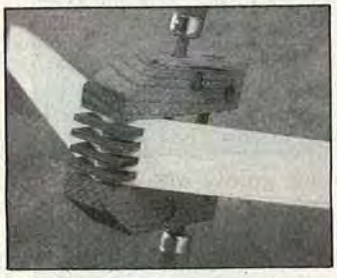
**Clamping together ensures a perfect fit*



MULTI-FEATHER



Cutting grooves with jig*



Clamping spline material

Sanding excess spline

**See the sketch on page 93 for how to build this jig*

DOVETAIL KEY

Cutting dovetail with router*

Ripping spline material**

Gluing and inserting spline keys

**See sketch on page 93 for how to build this jig*
***Cut spline material at same angle as that cut by the router bit*

GLUING AND CLAMPING PROCEDURES

It's hard to overemphasize the importance of correct gluing and clamping technique. Without it, miter joints never look "quite right." Luckily, though, there's nothing involved that you can't learn quickly.

Selecting and Applying Glue - Before doing any gluing and clamping, of course, you need to select the right glue for the task at hand. On most projects, we rely on the yellow woodworker's glue. But, if the project requires a glue with a bit more working time, we go with one of the polyvinyl acetate (white) glues. What about those situations that require a waterproof glue? We reach for the resorcinol or waterproof epoxy, the only truly waterproof glues. We like epoxy glue because of the strong bond it creates.

When we need a glue that sets up incredibly quickly, we haul out our hot-melt glue gun for simple jobs, or the hot-melt hide glue pot for the larger projects.

The photo at the top of the next column depicts how we apply yellow or white glue. We cover both joining surfaces with a thin layer of glue (a pencil brush makes an ideal applicator). We've found that the pencil brush deposits a sufficient amount of glue to do the job, but it doesn't give us a great deal of squeeze-out to remove. Note

also that we keep a cup of water nearby to keep the brush wet between uses. (Be sure to wipe the bristles dry before using it to apply more glue.)

Hot-melt gun glues, though not one of the strongest types available, do come in handy in many situations. In the photo at the top of the next column, you'll notice that

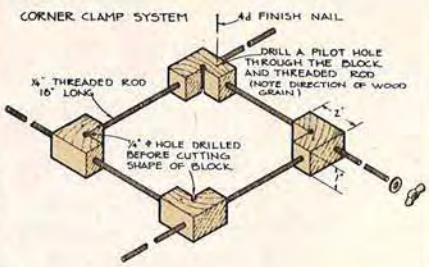
only hand pressure is necessary, and then only for 20 to 30 seconds.

When using hot-melt glue, keep in mind that it is HOT as it comes from the gun or pot, so be careful not to get burned. Also remember that you must work quickly or the glue will set up before you're ready. We've found that you have to slide the mating parts back and forth over each other to squeeze as much glue out as possible before it sets. Otherwise, it actually keeps the joint from closing properly.

Clamping Four-Sided Frames

In the two photos below, we show two ways to clamp four-sided

frames. In the first, we use four miter clamps. These work well, but a less-expensive option is to make your own clamping system. The following sketch shows how.

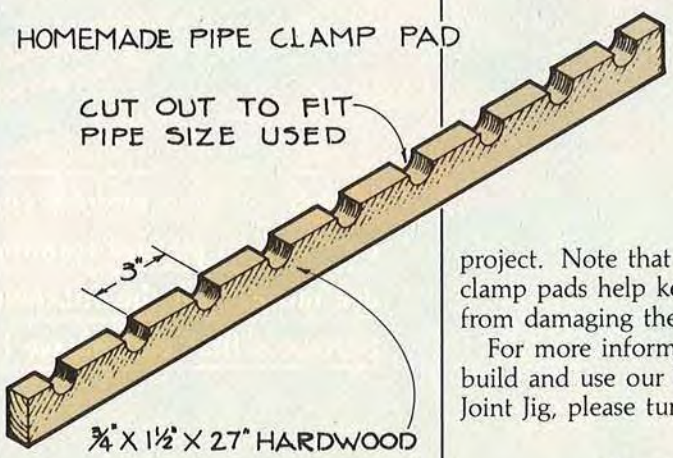

CORNER CLAMP SYSTEM
4d FINISH NAIL
DRILL A PILOT HOLE THROUGH THE BLOCK AND THREADED ROD (NOTE DIRECTION OF WOOD GRAIN)
¾" THREADED ROD 10" LONG
¾" Ø HOLE DRILLED BEFORE CUTTING SHAPE OF BLOCK
2"
3½"

Clamping Boxes

When gluing up cabinet carcasses and the like, you always need plenty of bar or pipe clamps. You'll also find our pipe clamp pads handy when it comes time to put the squeeze on your project. The pads allow you to apply uniform pressure along the length of the carcass.

The photo below shows the pads in use and the accompanying sketch

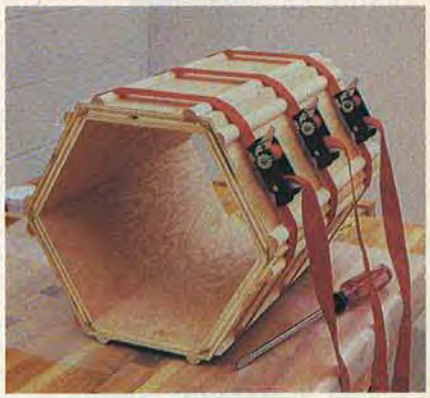
shows how to construct this simple-to-make device. After you're through with them, drill a hole in the end of each and hang them somewhere nearby.



Clamping Items With More Than Four Sides

Some hobbyists panic when it comes to clamping many-sided or odd-shaped projects. And granted, applying pressure in these situations can be difficult. But we've found that web clamps can come to your rescue in those difficult-to-deal-with scenarios.

In the two photos below, we



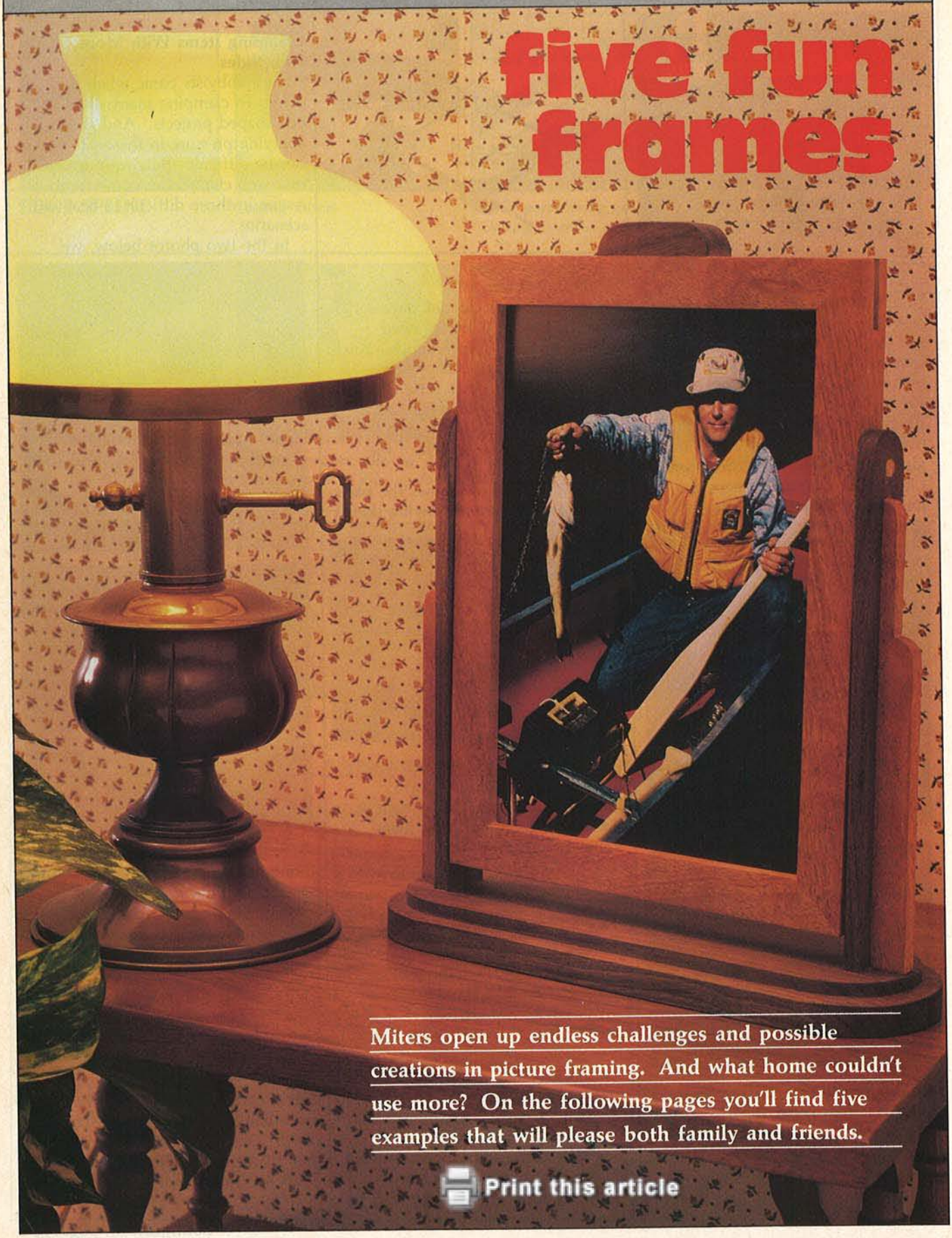
show how to clamp an octagonal frame and a larger hexagonal

project. Note that the half-round clamp pads help keep the straps from damaging the veneer edges.

For more information on how to build and use our Multi-Feather Joint Jig, please turn to page 93.

Continued on page 93

five fun frames



Miters open up endless challenges and possible creations in picture framing. And what home couldn't use more? On the following pages you'll find five examples that will please both family and friends.

Print this article

tilt picture frame

1 Rip two ¾"-wide strips from the 24" mahogany board for parts A and B. Cut a ¼" rabbet ⅜" deep along one edge of each strip, then miter-cut the frame parts to length. Test for a good fit, then glue and clamp the frame together.

2 Cut a ⅛" groove ¾" deep in each corner of the frame for splines (see page 45 for help with making feather splines). Cut spline to fit snug and glue in place.

3 Cut the walnut top trim piece (C) to size and glue it to the frame. Then, cut the base (D) to size. Radius its ends as shown, then cut it to its final shape. (We used a band saw to make the cuts, but a jigsaw or saber saw will work, too.) Sand as necessary, then cut the decorative rabbet.

4 To fashion the two E parts, rip a ¼"×15"-long strip from the mahogany board. Re-rip that strip to ½". Cut both parts to length, then lay out their final shape as shown in the drawing. Cut and sand smooth.

5 For the frame supports (F), rip a 1"×18"-long strip from the walnut board. Resaw the strip to its finished thickness (¼"). Cut both parts to length. Scribe and cut a ½" radius at one end of each piece.

6 Cut mortises into the base to accept F. We made the mortises by marking their position on the base (see the top view for particulars), drilling several ¼" holes, and using a chisel to clean and square them up.

7 Glue and insert the frame supports (F) into the mortises. To keep the supports square with the base, clamp a 9⅛"×10" plywood spacer block between the pieces. After the glue has dried, remove the clamps and the spacer, then glue and clamp the E parts to the uprights.

8 Set the frame between the supports, using spacers for exact positioning. Clamp the assembly together, then drill ¼" holes through the frame support assembly and ⅜" into the frame. Remove spacers from between the frame and supports, and insert birch dowel hinge pins. Trim off excess pin. (To ensure smooth movement at the pivot point, we put a small amount of paraffin wax in the drill holes.)

9 Sand all surfaces and apply finish of your choice.

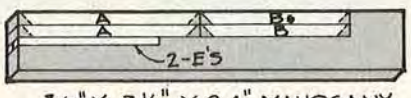
10 Cut the hardboard back (G) to size and install the picture and hardboard, using push points to hold them in place.

Bill of Materials

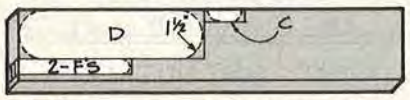
Part	Finished Size* T	W	L	Material	Qty.
A	¾"	¾"	11"	genuine mahogany	2
B	¾"	¾"	9"	genuine mahogany	2
C	¾"	½"	2"	walnut	1
D	¾"	3"	11⅝"	walnut	1
E	¼"	½"	7"	genuine mahogany	2
F	¼"	1"	8¾"	walnut	2
G	¼"	8"	10"	hardboard	1

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

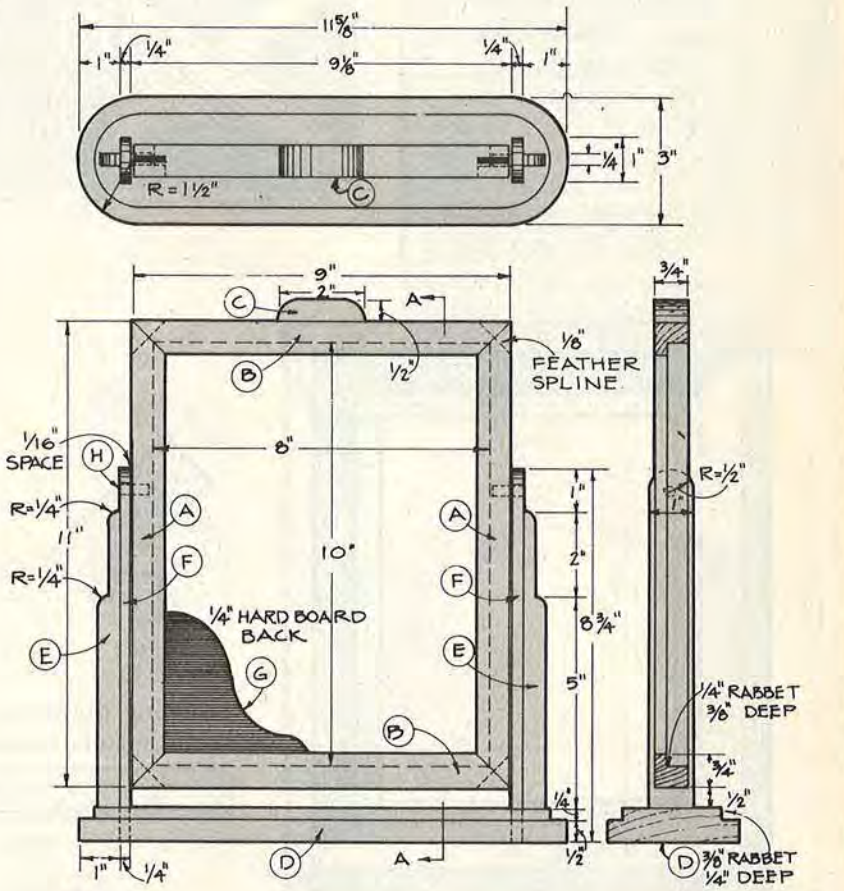
Supplies: Push points, woodworker's glue, oil finish, paraffin wax, ⅛" walnut spline material, ¼" birch dowel rod



¾"×3½"×24" MAHOGANY



¾"×5½"×24" WALNUT



walnut and maple frame

Note: With this project, we found it easier to assemble the walnut and the maple frames independently of each other and then glue and clamp them together.

1 Start by ripping a 2"-wide × 60"-long strip from your walnut board and a ½"-wide × 48"-long piece from the maple board.

2 Cut a ½" rabbet ¼" deep in the maple stock. (We used a table saw fitted with a dado set to cut the rabbet, but you could also use a router.) Then, bevel rip the maple at 45°, as shown in the frame section drawing below.

3 Cut parts A and B to length, plus 1" or so, and miter-cut one end of each. Set up a length stop and miter the other ends of each part to finished length.

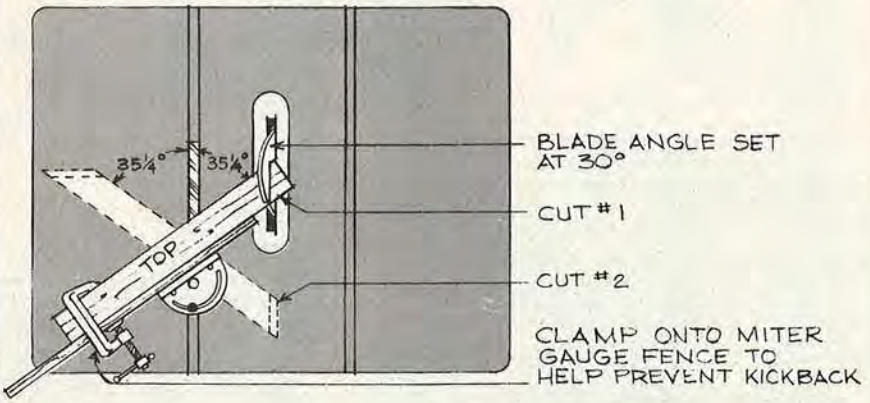
4 To compound miter-cut this frame's parts to length on a table saw, first cut each part to length, plus 1" or so. Then, tilt the saw blade to 30°, and set the miter gauge to 35¼°. Then, make test cuts on scrap material and check for proper fit. Chances are, your angles won't be right on the first time (ours usually aren't, anyway). For help with how to make adjustments to the miter angle, see page 47.

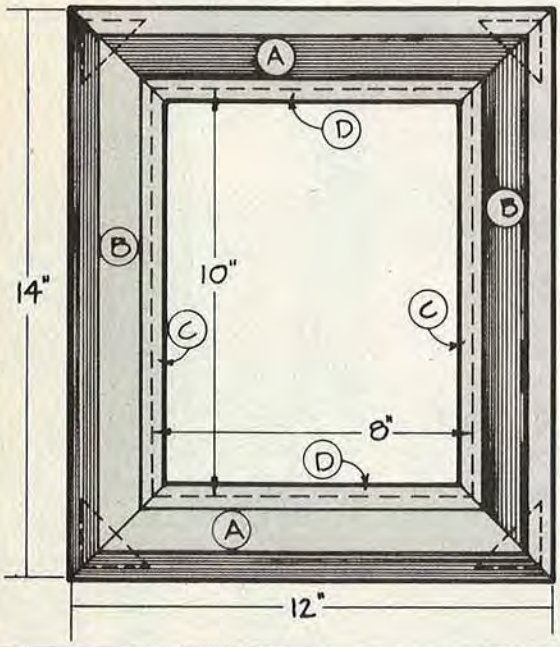
When you achieve the right settings, miter-cut one end of each frame member, then rotate the miter gauge to 35¼° on the opposite side of the right angle setting, set up a length stop, and miter the other end of each part as shown below.

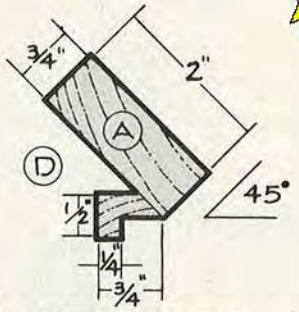
5 Fit the frames together to ensure a good fit at their corners, and to make sure the maple frame aligns with the inside edge of the walnut frame. Sand as necessary for a good fit. Glue and clamp each frame separately. We used miter clamps for the maple frame and spring clamps with toothed jaws for the walnut frame. After the glue dries, glue and clamp the two frames together.

6 If desired, cut feather spline grooves in the 4 outside corners with a "V" block jig. (See page 49 for more information on how a "V" block jig works.) Cut splines to fit the grooves and glue and clamp them in place.

7 Trim and sand the splines flush with frame. Finish-sand the frame and apply the desired finish.







Cutting diagram

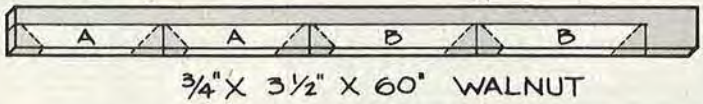
(See materials list for hardboard)

Bill of Materials

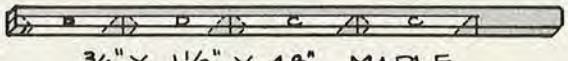
Part	Finished Size* T	W	L	Material	Qty.
A	½"	¾"	10½"	maple	2
B	½"	¾"	8½"	maple	2
C	¾"	2"	12"	walnut	2
D	¾"	2"	14"	walnut	2
E	¼"	8"	10"	hardboard	1

*Some pieces are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: Woodworker's glue, scrap walnut for splines, sawtooth hanger, your choice of finish



¾" X 3½" X 60" WALNUT



¾" X 1½" X 48" MAPLE

Walnut and maple frame
(See opposite page)

Quarter round frame
(See following page)

oval frame

1 Rip a 2"-wide strip from your cherry board. Crosscut parts A and B to length, plus 1". Then, set your miter gauge at 22½° and cut some scrap pieces to verify the angle. Miter one end of each piece. Rotate the miter gauge to 22½° on the opposite side of the right angle setting, set up a length stop, and cut parts A and B to length.

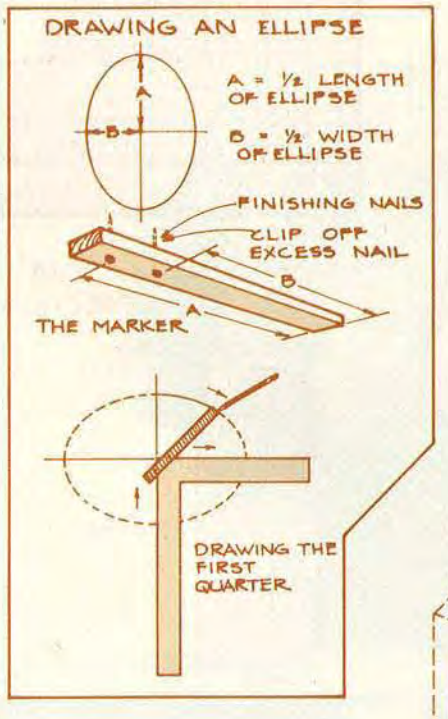
2 Using a band clamp, dry-clamp the stock and check for a good fit at the joints. Glue and clamp the cherry pieces together.

3 Draw an ellipse on a piece of cardboard as directed in the box at right. Cut out the shape, then tape the cardboard to the frame, and draw a line around it. Using a compass set to 1¼" and using the cardboard ellipse as a guide, mark the outside edge of the frame.

4 Saw the frame to its final shape and sand all surfaces smooth. Cut a rabbet around the back inner edge and shape the front edges with a router and a ¼" beading bit.

5 Sand, then finish as desired. We used gold leaf to highlight the edges of the frame. Insert hardboard.

¾" X 3½" X 36" CHERRY

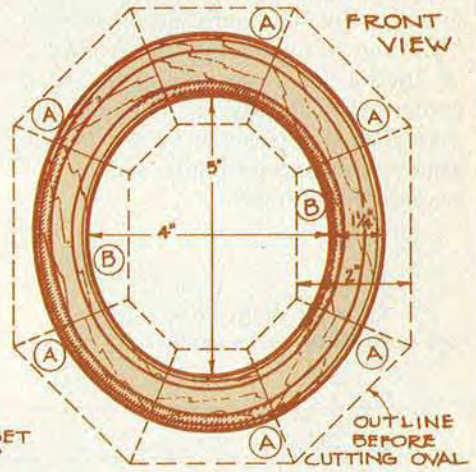


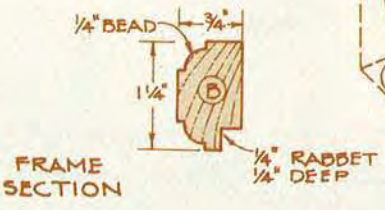
Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
A	¾"	2"	3"	cherry	6
B	¾"	2"	4"	cherry	2
C	⅛"	(to fit)		hardboard	1

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: Imitation gold leafing kit (available at most crafts shops), woodworker's glue, finish, sawtooth hanger





Continued

quarter-round frame

1 Rip a 2½" strip from your pine board. Now, crosscut the ½" and ¼" quarter-round to 72".

2 Using brads (to be removed later), glue the ½" quarter-round (C) to the pine strip. (See the frame section drawing for correct positioning.) Again using glue and brads, fasten the ¼" quarter-round (D) to the pine as shown to form a rabbet on the inside edge of the frame. Remove brads and excess glue after it has formed a tough skin. (We used a cabinet scraper for this.)

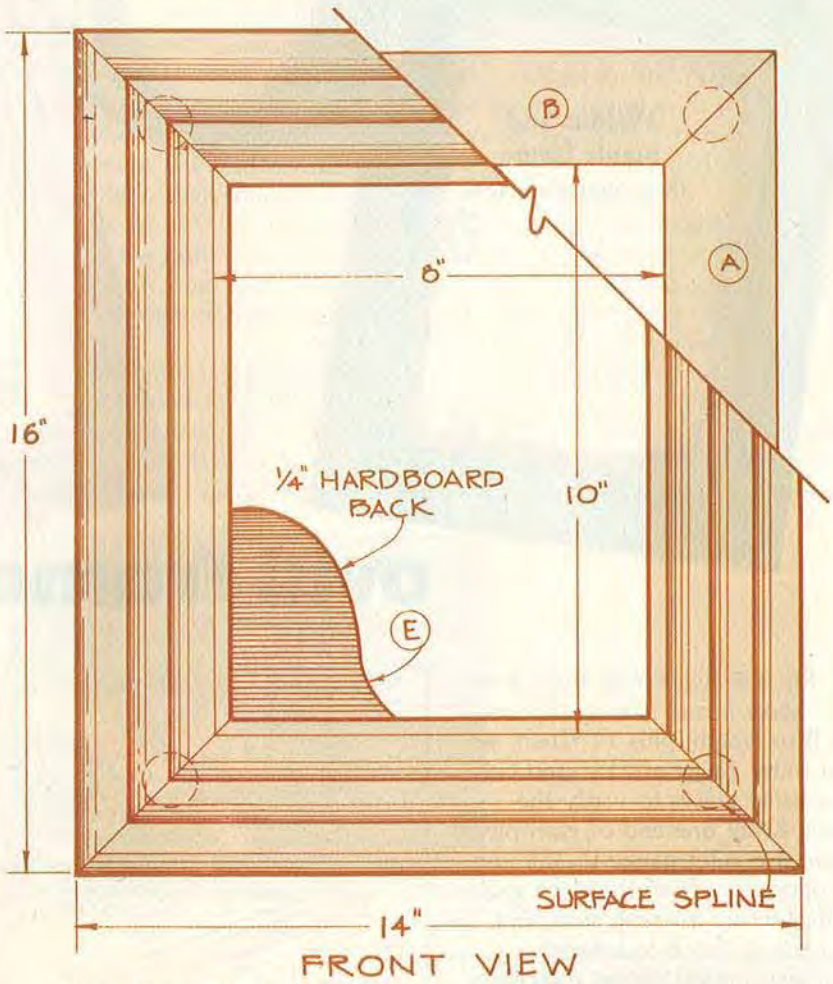
3 Crosscut the frame parts (A and B) to length, plus 1" or so. Miter one end of each part, then set up a length stop and miter the parts to length. (As always, make test cuts first to check for correct angle.)

4 Glue and clamp the frame parts together. (We used four miter clamps.) Remove excess glue after a tough skin forms, then allow the glue to dry.

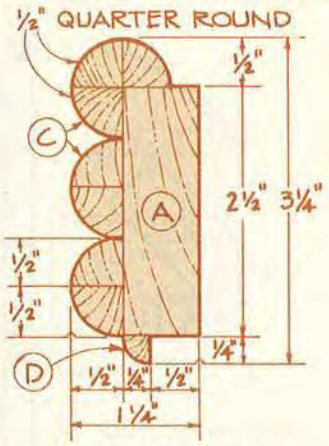
5 With the frame facedown on a flat surface and using a 13/16" spade bit, bore ¼"-deep holes at each of the joint lines. Then, using a 1" hole saw with the pilot hole drill bit removed, cut and sand plugs from scrap pine. Glue and clamp the plugs. After the glue has dried, sand the plugs flush with the surface of the frame.

6 Fill all brad holes with wood putty and sand all surfaces smooth. Cut the hardboard to size.

7 Prime and paint the frame. We used a flat white spray-on primer sealer and two coats of high gloss enamel. After the paint completely dries, mount photo and hardboard backing.



FRONT VIEW



FRAME SECTION

Cutting diagram
(see materials listing for hardboard)

¾" X 3½" X 72" PINE

Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
A	¾"	2½"	14"	pine	2
B	¾"	2½"	16"	pine	2
C	½"	½"	96"	pine quarter-round	7
D	¼"	¼"	96"	pine quarter-round	1
E	¼"	8"	10"	hardboard	1

*Some parts are cut longer initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: Brads, wood putty, primer, paint, 1—sawtooth hanger, scrap pine for plugs, woodworker's glue

portable belt sanders

which one is right for you?

Do-it-yourselfers find it hard to justify the expense of a belt sander, but this versatile tool is commonplace in the woodworker's shop. What they are as well as what they'll do are the subjects here, and there's a handy comparison chart.

Portable belt sanders do several important things well. While they're designed primarily to remove lots of wood quickly and make surfaces flat, you also can flip many models on their back and use them as a bench sander for smoothing small and irregularly shaped pieces, and for sharpening tools.

Compared to your food processor or a Swiss Army knife, a belt sander may not sound like the world's most versatile tool. But when you think about it, the need to remove stock or flatten surfaces (or sharpen tools) pops up with depressing regularity during most woodworking projects. Fact is, if you build solid-wood furniture, make glued-up cabinet doors or tabletops, or do much woodworking at all, you'll learn to appreciate a belt sander in a hurry.

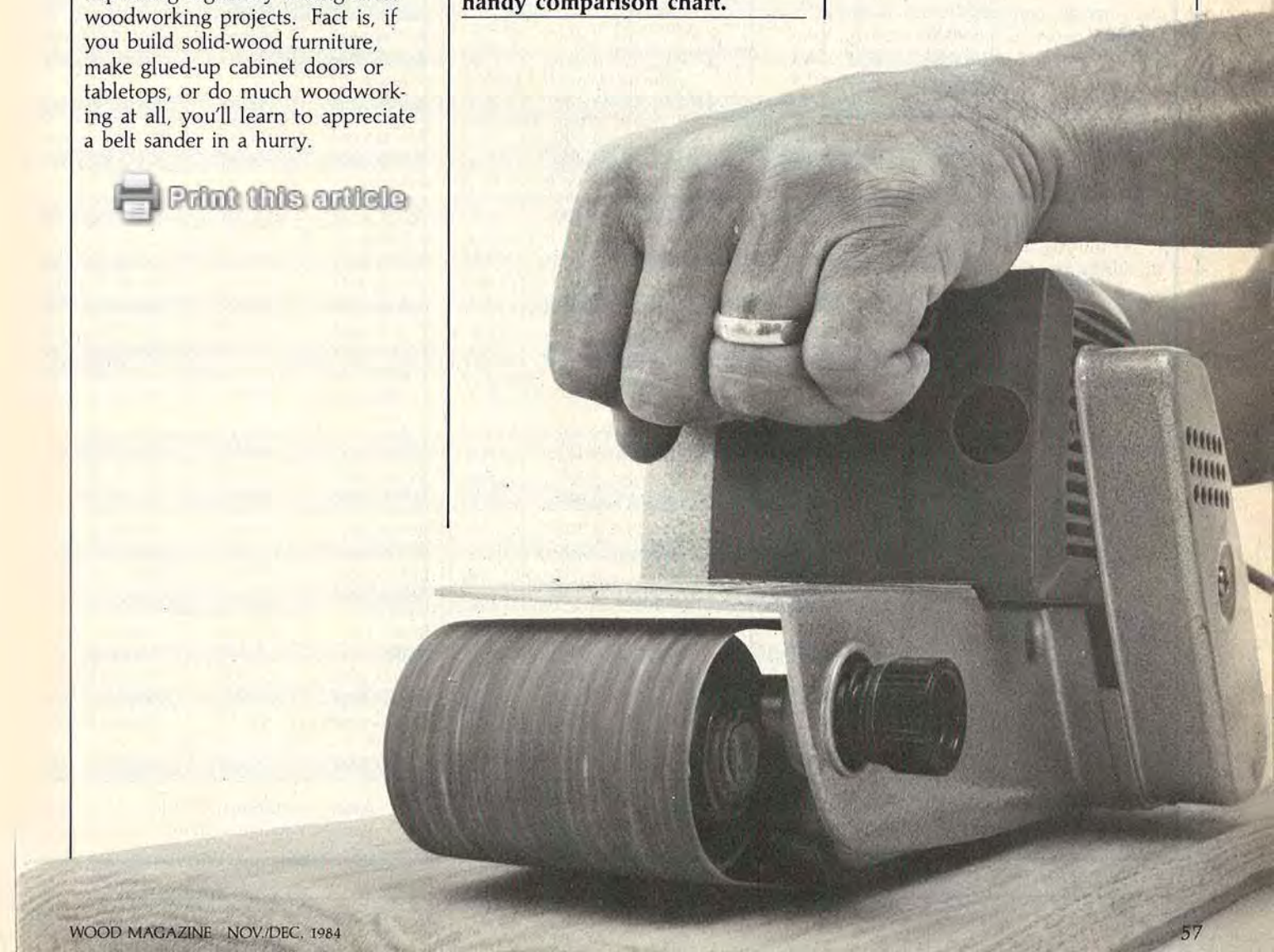
Print this article

How Belt Sanders Work

The business end of a belt sander consists of a removable abrasive belt that is looped around—and held in tension between—two rollers. The tool rests on a flat metal plate over which the abrasive travels. A *belt-and-gear* drive system or an *all-gear* drive apparatus links the roller assembly to the tool's motor.

Most machines are belt-driven (see the photo on page 59). A grooved or toothed belt-and-pulley

Continued



WHAT'S WHAT IN PORTABLE BELT SANDERS

Brand	Model #	Weight	Belt Size	F.P.M.	Amps	Drive Mech.	Belt Change	Belt Adj.	Dust Coll.
Black & Decker	7447 T	7.25	3×21	600	3.4	Belt & gear	Push	Knob	No
	7496 T	5.25	2½×16	600	4.75	Belt & gear	Lever	Knob	Yes
	7451 T	8.75	3×24	1,200	5.2	gear	Lever	Knob	Yes
Black & Decker Commercial	4025-10 *	9.6	3×21	1,180	8.4	Belt & gear	Lever	Knob	Yes
	4026 *	10.5	3×24	1,500	8.4	Belt & gear	Lever	Knob	Yes
	4030-10	16.5	4×24	1,150	8.7	Belt & gear	Lever	Knob	Yes
Bosch	3270D	7.1	3×21	900	6.3	Belt & gear	Lever	Knob	Yes
	1272	13.8	3×24	1,550	10.5	Belt & gear	Lever	Knob	No
	1272D	14	same as above but with dust collector						
	1273	14.6	4×24	1,550	10.5	Belt & gear	Lever	Knob	No
	1273D	14.8	same as above but with dust collector						
Hitachi	SB75 T	10.8	3×21	1,475 1,180	8.7	Belt & gear	Lever	Knob	Yes
	SB8T	11.4	3×24	1,475 1,180	8.7	Belt & gear	Lever	Knob	Yes
	SB8TA T	11.4	3×24	1,475 1,180	8.7	Belt & gear	Lever	Knob	No
	SB110	12.1	4×24	1,150 985	8.7	Belt & gear	Lever	Knob	Yes
Makita	9900B T	10.0	3×21	1,180	7.8	Belt & gear	Lever	Knob	Yes
	9924B T	10.2	3×24	1,300	7.8	Belt & gear	Lever	Knob	No
	9924DB	10.5	same as above but with dust collector						
	9401	16.0	4×24	1,148	8.5	Belt & gear	Lever	Knob	Yes
Milwaukee	5900	15.75	3×24	1,700	9.5	Belt & gear	Lever	Knob	Yes
	5930	14.5	4×24	1,400	10.00	Belt & gear	Lever	Knob	No
	5935		same as above but with dust collector						
Porter-Cable	336 T	9.5	3×21	1,300	6.5	Belt & gear	Push	Knob	No
	337		same as above but with dust collector						
	360	16.0	3×24	1,500	10.5	Belt & gear	Lever	Knob	Yes
	361	14.0	3×24	1,550	10.5	Belt & gear	Lever	Knob	No
	362	15.25	4×24	1,500	10.5	Belt & gear	Lever	Knob	Yes
	363	14.25	4×24	1,550	10.5	Belt & gear	Lever	Knob	No
	503	15.0	3×24	1,500	9.0	Worm gear & chain	Lever	Knob	Yes
	504	14.0	3×24	1,600	9.0	Worm gear & chain	Lever	Knob	No
Ryobi	B7075 T	9.6	3×21	1,181	8.4	Belt & gear	Lever	Knob	Yes
	B7100 T	9.7	3×24	1,500	8.4	Belt & gear	Lever	Knob	Yes
	B7200A	16.7	4×24	1,148	8.7	Belt & gear	Lever	Knob	Yes
Sears	1178 T	17.0	4×24	1,300	7.5	Belt & gear	Push	Knob	Yes
	1175 T	12.5	3×21	1,300	7.5	Belt & gear	Push	Knob	Yes
	1172	12.0	3×21	1,300	7.5	Belt & gear	Push	Knob	No
	1170 T	7.2	3×21	1,300	6.0	Belt & gear	Push	Knob	No
Skil	593 T	4.5	2½×16	600	2.8	gear	Lever	Knob	Vac
	603 T	6.0	3×18	700	3.3	gear	Lever	Auto	Vac
	400	12.5	4×21¾	1,350	7.00	Belt & gear	Push	Knob	Yes
	595 T	7.75	3×21	1,000	5.5	Belt & gear	Push	Knob	Yes
	449	15.5	3×24	1,300	10.0	Worm gear & chain	Lever	Knob	Yes
	1400	10.85	4×21¾	1,460	9.0	Belt & gear	Lever	Auto	Yes

T = Tested by WOOD
* = So new not available for testing at press time

Auto = Automatic
Vac = Vacuum system

Bearings	Sands Flush	Price
Ball/sleeve	Yes	$49.99
Ball/sleeve/needle	Yes	$54.99
Ball/sleeve	Yes	$114.99
Ball/sleeve	Yes	$175.00
Ball/sleeve	Yes	$185.00
Ball/sleeve	Yes	$249.00
Ball/needle	Yes	$189.00
Ball bearing	No	$259.00
	No	$274.00
Ball bearing	Yes	$274.00
	Yes	$289.00
Ball/sleeve	Yes	$195.00
Ball/sleeve	Yes	$209.00
Ball/sleeve	Yes	$199.00
Ball/sleeve	Yes	$275.00
Ball/needle	Yes	$191.00
Ball/needle	Yes	$198.00
	Yes	$208.00
Ball/needle	Yes	$273.00
Ball/needle	No	$335.00
Ball/roller	Yes	$260.00
		$280.00
Ball/needle	Yes	$164.00
		$174.00
Ball/needle	No	$269.00
Ball/needle	No	$249.00
Ball/needle	Yes	$284.00
Ball/needle	Yes	$269.00
Ball/needle	No	$495.00
Ball/needle	No	$480.00
Ball/sleeve	Yes	$160.00
Ball/sleeve	Yes	$198.00
Ball/sleeve	Yes	$245.00
Ball/roller/sleeve	Yes	$129.99
Ball/roller/sleeve	Yes	$99.99
Ball/roller/sleeve	Yes	$89.99
Ball/roller/sleeve	Yes	$69.99
Ball/needle	Yes	$69.99
Ball/needle	Yes	$79.95
Ball/sleeve	Yes	$289.00
Ball/sleeve	Yes	$164.95
Ball bearing	Yes	$499.00
Ball/needle	Yes	$249.00

F.P.M. = Feet per minute

system connects the sander's motor to a set of reduction gears attached to the tool's rear, or drive, roller. (Some heavy-duty sanders—they can cost $500 or more—come with a no-nonsense chain in an oil bath rather than a belt.)

All-gear models eliminate the drive belt entirely, and with it, the problems of slipping belts. They can present interesting design problems, however, since the tool's motor must be placed relatively close to the drive roller. One manufacturer, Black & Decker, positions the motor inside the sanding belt on some models, a smart solution that also keeps the weight of the machine centered and low.

How Much Belt Sander Do You Need?

When you begin researching belt sanders, you'll notice that they're categorized by the size of abrasive belt they use. Mini-sanders with 2"- or 2½"-wide belts can be excellent tools for small projects—for vertical sanding or for such tasks as working inside cabinets. Because they're small and light, you can control them easily and work with them for long periods without tiring. Mini-sanders can be short on power and speed, though—factors that minimize their usefulness on large projects. And their nonstandard belt sizes also limit the availability and variety of abrasive belts that fit them.

Most of the machines you'll find use 3"×21" or 3"×24" belts. Of the two, the 3"×24" machine is particularly efficient. Its longer belt creates a larger sanding surface, which speeds up the work and improves the stability of the tool, a welcome characteristic when you're operating the sander near the edge of a workpiece.

For big jobs such as gluing up stock for doors, tabletops, or other large surfaces, a 4"×24" belt sander provides 33% more sanding area than most 3" machines. The substantial weight and power of this size machine allow you to smooth surfaces quickly and evenly. These same features, plus the higher cost of 4"×24" machines, make them less suitable for smaller work or small workshops.

Pay attention to the number of amps a belt sander draws, too. It's this rating that tips you off to how powerful the machine is. For light-duty applications, machines with lower amp ratings will serve you well, but you won't go wrong buying as much amperage as you can afford within the category you've decided on. We've included in the chart the amp ratings of most of the sanders you're likely to come across.

Why Weight and Balance Make a Difference

The ideal belt sander should be heavy enough to cut smoothly on its own, well balanced so you can control it without exerting substantial down-pressure on the tool, and be able to rest evenly on its pad and not show a tendency to tip to one side or the other.

If you have to bear down on the sander to get it to cut properly, or fight the machine to keep it under control, you'll probably leave dips or wave marks in your work. And, likewise, if it is back- or front-heavy, you'll have to compensate continually, which will make controlling the tool a problem, particularly along edges and near corners. You'll also find that using a sander that isn't well balanced will cause hand and wrist fatigue.

What About Dust Collection?

Though you can buy belt sanders without a dust-collection system, the neatness of your shop and the

Continued

well-being of your lungs make some type of sawdust collector a practical necessity. Of the two general options—a dust bag attached to the sander or a vacuum assembly that connects by a hose to a shop vacuum, we like the former better. Both systems do work, but vacuum hoses can catch on an edge of your project, stop the sander in its tracks, and cause you to gouge your work.

Belt Sanders as Bench Tools

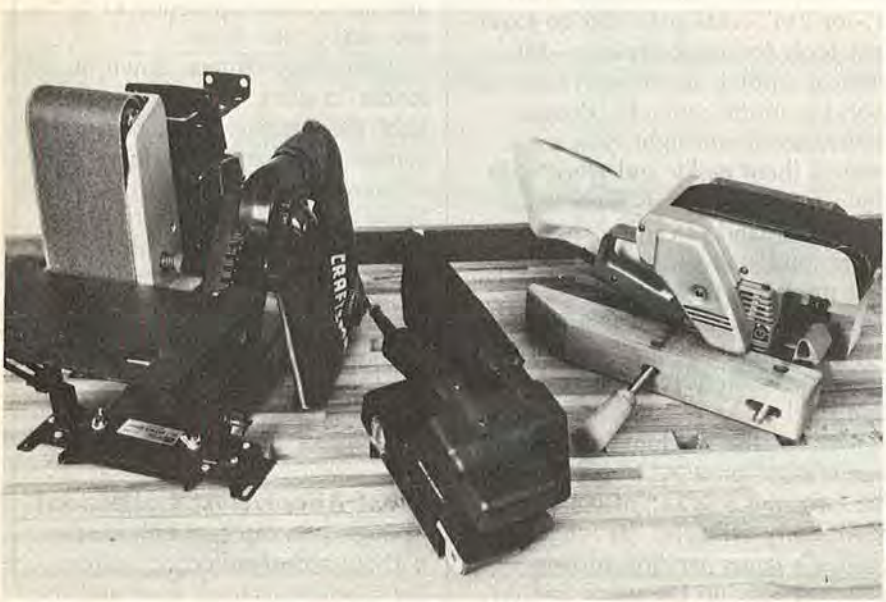
The belt sander doubles as a bench tool in many home workshops. If that's your plan, too, check to make sure the model you plan to buy has been designed for this use. Some sanders have flat tops and handles, a design that allows you to clamp the tool upside down on your workbench. Others feature threaded holes tapped into the top of the machine that enable you to screw the sander to a board or bench.

Stands or brackets, a third variation, let you mount still other belt sander models for use as a bench tool. We show examples of each option in the photo below. Note: If you do use the sander in this fashion, follow the manufacturer's safety recommendations closely. A coarse abrasive belt doesn't know the difference between softwood and soft flesh.

Your Belt-Changing and Adjustment Options

With most belt sanders, you change abrasive belts by pulling out a lever release. Doing this causes the machine's front roller to move backward, relieving tension on the sanding belt.

On others, you need to push the front roller against a solid surface (see the photo above). This locks the mechanism in place and removes tension from the sanding belt. A second push unlocks the nose roller, which returns to its normal operating position and reapplies tension on the belt. Both systems work, so you'll have to handle a few of each type to decide which system you prefer.



More important from a buymanship point of view is the location of the knob that centers the abrasive belt over the rollers and metal plate. (Skil has introduced two models on which the belts center automatically.) If the knob is located too far back on the sander, or if it's hidden away under the drive-belt housing, you'll have to interrupt your work to center the belt.

Other Things to Consider

Often, minor details can mean the difference between a favorite tool and a machine that gathers dust rather than makes it. As you shop for a belt sander, consider the following:

- Does the power cord look heavy enough to withstand abuse? More than one woodworker has run over a cord accidentally. If the cord can survive a reasonable amount of punishment, such a mishap might not terminate your day's work early.

- How long is the cord? Belt sanding often requires substantial movement over large areas. Extension-cord plugs have an uncanny ability to hang up on things, causing the sander to nose-dive and gouge your work. A long power cord can be a valuable asset.

- Does the machine's switch lock in the "on" position for extended periods of sanding? If it does, could you lock it on accidentally?

- Do the handle and switch work together well so that your hand and wrist will remain comfortable as you sand? Is the machine's front knob well-contoured and comfortable?

- Belt sander prices range from under $40 to $500 or more. Lightweight, inexpensive machines will meet the needs of many woodworkers. As with most tools, however, as the price goes up, so do such variables as finish and general workmanship, quality of parts, and the ability to perform a task efficiently and effectively. ■

WOOD tests "under-$200" portable belt sanders

When we began doing the research for this article, we were surprised to find out how broad the choices are in this product category. The table on pages 54-55 lists over 40 different machines from which you can choose, some with price tags as high as $500.

We decided to take a close look at those belt sanders retailing for less than $200. We used all of the sanders on several projects in our shop, and while doing so, paid particular attention to their balance, ease of handling and adjustment, and how well they do the jobs for which they are designed. Following are our findings.

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BLACK & DECKER

The *7447* 3"×21" belt sander, the latest addition to this company's consumer line, runs at a slow 600 fpm (feet per minute) and is very light, especially considering its size. If you have never used a belt sander before, these factors can work in your favor since the machine will remove stock much more slowly than heavier, more powerful machines. On the other hand, once you get used to using a belt sander or when you begin making more projects with glued-up stock, you will probably find this tool inadequate for your needs.

We like the handle configuration and feel the *7447* is fairly well balanced. Along with its flattop handle design, Black & Decker molded threaded holes in the top to attach this machine to a board for bench-top duties.

The *7496*, a compact West German import, costs only a few dollars more than the *7447*, but has several added features. It sports a compact dust bag and a lever tension release. And its flattop design allows for bench-top use. We found this lightweight sander a good choice for small work and vertical pieces such as face frames. It has a much smaller sanding surface than a full-sized sander, though, so you need to be more careful to keep from rocking it. The only thing we don't like about the *7496* is the front handle, which is awkward to hold.

Black & Decker's *7451*, one of the more unique sanders on the market, has its motor on the inside of the sanding belt. And with its all-gear drive system, it has no drive belt to break. The low profile of the *7451* allows it to go places other machines can't. This design also allows for excellent balance and control. Other design amenities include comfortable handles, an easy-to-reach belt-alignment knob, and an out-of-the-way, easy-to-operate lever tension release.

We found the nose guard a bit of a mixed blessing. Although it was handy to keep the front roller from banging into a vertical surface, it was a nuisance when we wanted to sand a curve.

HITACHI

Of the two under-$200 sanders Hitachi makes, the *SB75* 3"×21" is far superior to the *SB8T*, yet both machines share nearly identical characteristics. They're fairly well balanced (although a bit left-side heavy) and have an easy-to-grasp and -operate rear handle and front T-handle, as well as two-speed mo-

Continued

tors (a feature we like a great deal). Both also have an almost inaccessible belt tracking control knob.

So why is the *SB75* a better machine than the larger *SB8T?* The answer lies in Hitachi's method of accommodating the longer belt. With the *SB8T,* they screwed on a formed metal snout extension and used a longer front roller mechanism but didn't extend the length of the platen. The design flaw causes two problems. First, you can't sand very close to a corner, and, second, the machine tends to gouge.

MAKITA

Makita uses the same motors and handle designs on both their 21" *(9900B)* and 24" *(9924B)* belt sanders. They do, however, employ two totally different base castings. Both boast an easy-to-hold front T-handle and a rear handle that allows the operator to lay the tool on its back (without any brackets) for bench-top use. Both have excellent overall balance and plenty of power.

We also appreciate the fact that Makita obviously believes in plenty of cord. Each machine has an 18-footer, which is 10 to 12 feet more than any of the others we tested.

When using these machines, we did notice a couple of interesting things. The rear handle angle we found to be somewhat arm-wearying when working at workbench height. And with both of the machines we tested, the belt release levers, though well placed, had so much play they would ride out beyond the side of the machine (see the photo).

9900B

9924B

PORTER-CABLE

We found the *336* 3"×21" and its dust-collector clone, the *337,* well balanced and easy to control. The large front and rear handles make the machines comfortable to operate. We also like the high-quality, commercial-type switch, a feature not found on any of the other machines in our tests. The large, tracking control knob, though plenty far back, sticks out far enough that you can manipulate it easily while sanding.

Porter-Cable did not design their push-type belt release to completely release the belt.

Instead, once tension is released, you must click the motor on for a moment to get the belt to slide off. To replace the belt, you slip it over the rollers, release the front roller, flip the switch, and the belt will ride into position. The system works, but it takes some getting used to.

336

337

The dust collector, one of the better ones on any of the belt sanders we tried, is up and out of the way and doesn't leak air where it attaches to the sander (some do leak). Because of the rear handle's design, neither the *336* nor the *337* lends itself to bench-top belt sanding. Porter-Cable told us their policy is that a portable tool is just that and should not be used as a bench tool.

RYOBI

The *B7075* 3"×21" belt sander and the *B7100* 3"×24" have identical drive trains, motors, handles, and dust collection systems, but different base castings and platens. The larger machine, with its faster belt speed, cuts large surface areas down to size quickly. (You'd want to be careful with it on smaller work.)

Though not built with as heavy materials as some of their foreign-made rivals, their cost reflects it. (They cost approximately 16% less than Makita.) They do, however, have a nice feel, with the weight well distributed.

We found the tension-release lever nicely accessible and, although it has considerable play, it stays behind the plane of the platen's edge. A unique tracking control knob resides on the front deck of the sander, a location making it easy to reach and manipulate. We also like the easy-to-grasp handle, but its shape isn't as comfortable as the T-handle shape on other machines.

B7100

B7075

SEARS

Of all sanders we tested, only Sears sells one with a 4"×24" belt within our $200 limit—the *1178*. A heavy brute, this machine is much too large for many home craftsman applications, but it does have two favorable points.

First, it's large enough to do big jobs quickly. It did a great job on sanding glued-up panels for a desk and a large solid oak tabletop. Because of the generous size of the platen and the extra inch of sanding belt, the machine rode smoothly over these large surfaces with little effort.

The other advantage is its available bench stand (see page 56 for a look at it). This accessory lets you position the sander at several different angles and has a worktable/end stop built into it. The stand also fits other Sears belt sanders, but we feel the 4"×24" model makes the best use of it.

The *1172* (not shown) and its dust bag-equipped look-alike, the *1175*, handle well and have good balance. The handles on these, and the other Sears sanders, make controlling the machines an easy matter.

The *1170* 3"×21" belt sander features an interesting three-roller design. A belt-drive tool, it has the motor mounted inside the belt for low weight distribution, much in the manner of the Black & Decker 3"×24" model. Though lightweight, this machine handled well and cut evenly.

On most belt sanders with the dust-collection option, the dust outlet port is built into the motor housing. Sears, on the other hand, has two models—the *1175* and the *1178*—with side-mount dust collectors. When using these machines, we found these collectors bulky and in the way.

SKIL

The *593* 2½"×16" and *603* 3"×18" "Sandcat" models look almost identical. Designed for one-hand operation, both have an auxiliary knob that is removable. And both performed nicely on vertical and over-the-head jobs and were useful inside cabinets. Sanding large flat surfaces such as tabletops with them, though, would take a great deal of time.

Located at the front of the *593*, on the left side, are easily accessible controls for both tension release and tracking. The larger *603* uses Skil's new "autotrack" system, which keeps the belt in alignment with the edge of the platen without any operator adjustment. At first, we had some amount of trouble with the belt running off the rollers, but after adjusting the automatic system, it ran fairly true.

Both the *593* and the *603* have all-gear drive trains, with the motor mounted at the very rear of each.

This design creates some problems in our opinion. When operating these back-heavy models, you must continually push down on the front to compensate for the poor weight distribution. We also had trouble with both machines at the edge of work. We had to be extra-careful to keep them from rocking over the edge and beveling it.

By far the best belt sander of the three in this group, the old-style *595* 3"×21" boasts an all-cast aluminum housing, and costs about as much as the other two put together (it's worth it).

One of the best-balanced machines we looked at, the *595* has well-shaped, easy-on-the-wrist handles, an up-and-out-of-the-way dust bag, and an easily adjusted tracking control knob.

Although just under 8 pounds, this sander doesn't seem too light to handle the larger pieces. And being so simple to control, it works quite well on face frames and other narrow items. ■

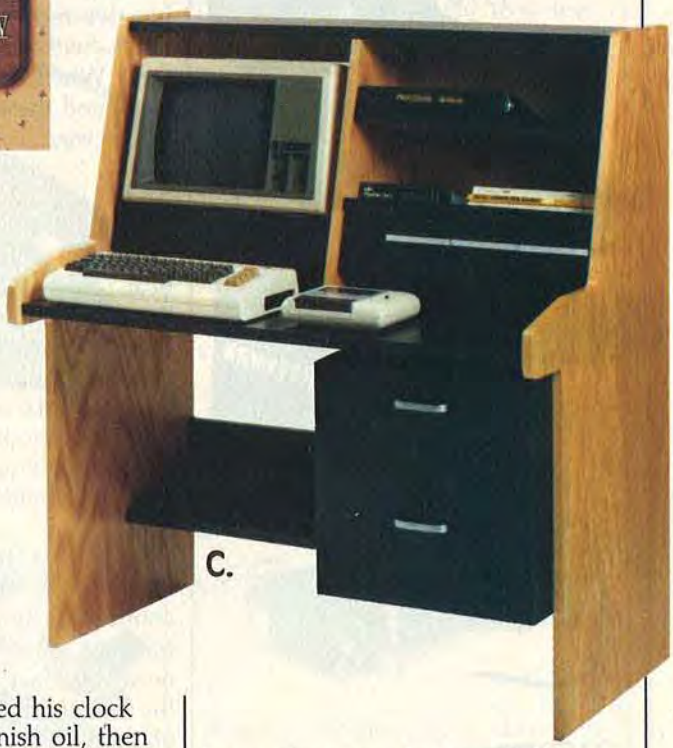
Project Showcase

There's a lot of quality woodworking being done these days, and we'd like to show it off. In each issue of WOOD, we'll devote this space to projects submitted by our readers. Until they start coming in, we're showing the work of staff, friends, and acquaintances. To send in your projects, see the instructions at the end of this article.

Print this article

A.

B.



C.

A. Home Bar

John Kleindienst, of Jefferson City, Missouri, wouldn't settle for less than an ornate pub-style bar for his basement. Four years and piles of sawdust later, he had it. An accomplished woodworker, John built it in five stages, each offering new challenges to his skill. The lazy "s" handrail consists of 260 band-sawed pieces glued together.

The 30"×30" laurel wreath and gothic scrolls (see inset) are of maple, and took nine weeks with an electric hand rotary to carve. Grape clusters atop the back bar were individually cut, then carved before gluing into place because that method added dimension.

Except for the hand-beveled cabinet door glass and brass foot rails, which were purchased, John handcrafted everything and estimates there are more than 2,000 pieces of wood in the completed bar and stools. John worked from a design drafted by his mother.

B. Wall Clock

Using scrap walnut left over from a larger project, Jim Harrold, Des Moines, Iowa, created this striking timepiece. The backplate is of edge-joined 1×4s rounded with a band saw then sanded smooth. The front piece is solid walnut, routed in back to a 2" depth to accept the movement. Jim finished his clock with a penetrating Danish oil, then a spray coat of polyurethane varnish for a slight sheen.

C. Computer Center

Inexpensive, but completely functional were the guidelines set by Jim Downing, Des Moines, Iowa, when he decided to build a station for his home computer. Its overall dimensions are 44" high × 23½" deep × 40" long. The work surface height is 26 inches. End panels are made of ¾" plain-sliced red oak plywood with matching edge tape. Particleboard, covered one side with black plastic laminate, the other

D.

D. Jointer Plane

Collecting old tools often leads to making them yourself. This is what happened to Jerry Tow, Ames, Iowa. Now his hobby is building tools, such as the jointer plane shown here. Measuring 22" long × 8" high × 2½" wide, it's made from solid stock, not built up. The throat and detachable fence are maple; the handles walnut; and the sole is ebony.

Jerry believes wood planes perform better than metal ones. They're lighter, have 50 percent less friction with the surface, and cut better, especially when you fit them with old laminated steel irons, as he has. Besides, he says, you can make them to fit your hands.

E.

E. Gaming Table

Two-inch-thick wedges of oak and teak, edge-joined with splines, make up the outer ring of this 44"-diameter game table. Carson Ode, Des Moines, Iowa, templated, cut, and assembled the top in quarter sections, numbering each piece as he went. The ¾" solid oak center circle insets the ring and provides a recess that accepts the base. Carson built the base in barrel stave fashion, using circular plywood braces inside. Oak boards are dadoed in back to fit against the braces and the eight oak legs, which were band-sawed to shape. For ultimate protection, he finished the table with a polyurethane varnish.

F.

F. Child's Crib

Toys, clothes, and linens are within easy reach in the combination crib/storage unit built by George Granseth, also of Des Moines, Iowa. The rigid crib frame with spindles all around is of red oak with corner joints mortised and tenoned, then screwed for security. George made the spindles ¾" square, then used a jig to form dowels at the ends of each. Once frame and spindles were assembled, he rounded the inside faces with a router and ¼" bit.

A two-drawer base attaches to the frame at the corners. Made of plywood and covered with plastic laminate, its top supports the regular size 53"×28" child's mattress.

Wooden cribs parts are finished with nontoxic Danish oil. ■

with balance sheet, was used for the shelves and large drawers.

Adjustable in height and angle, the TV/monitor shelf also will lay flush with work surface. Other shelves move up or down, and can accommodate disk drives.

To Submit Your Projects: Send a 35-mm color slide, with the project as the focal point in a simple background. No people, please! Include a capsule description—materials used, special joinery techniques, finish, etc. *WOOD* will pay $25 for published projects. Unless otherwise requested, we will keep the slides.

Send to:

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Des Moines, IA 50336

choosing and buying cabinet-quality lumber

Print this article

The wood used for furniture and other fine projects differs in many ways from lumberyard 2×4s. Here's where you find out how and why.

Long-time woodworkers have learned through experience the importance of choosing their lumber carefully. They know which species perform well in certain situations, which thicknesses are needed for various projects, and dozens of other important things about choosing and using this most intriguing material. This article attempts to share some of that hard-won knowledge with you.

The first thing to realize about cabinet-quality lumber is that the rules you probably know about ordering dimension lumber (the type you use for carpentry work) don't apply. Sizing, grading, ordering — they're all different.

Commonly Used Species

Species	Characteristics	Relative Cost
Ash (White)	Broad grain pattern, strong, easy to bend, easy to work, tends to split.	Moderate
Birch	Finishes well, can be made to resemble more expensive woods.	Moderate
Cherry	Machines and finishes well, though it has a tendency to burn when sawed or routed.	Moderate
Genuine Mahogany	Works and finishes well, relatively easy to work.	Moderate
Philippine Mahogany (Red Lauan)	Easy to work, coarse texture, finishes well.	Inexpensive
Maple (Hard)	Most adaptable of all hardwoods, takes stain and works well.	Moderate
Oak (Red & White)	Strong, heavy, finishes well, difficult to shape.	Moderate
Pine (Sugar, Eastern, Idaho)	Finishes well, easy to work.	Expensive (Clear Grades)
Poplar	Moderately easy to work, finishes well, fairly weak, doesn't hold nails well.	Inexpensive
Redwood	Easy to work, lightweight, finishes well.	Varies By Grade
Walnut	Strong, durable, works and finishes well, fine grain.	Expensive

Also keep in mind that except for a few white pines, such as Sugar and Idaho, redwood, and aromatic cedar, most of the time you'll be working with hardwoods. (See the list of popular lumber species below.)

Understanding Moisture Content

All cabinet-grade lumber begins as a "green" board that's been mill-sawed from a freshly felled tree. The moisture content of a green board will be 28 percent or greater, making it unsuitable for woodworking, since all wood shrinks, warps, and splits as it dries.

To remove moisture from green boards, most manufacturers air-dry and kiln-dry them. Air-drying reduces the moisture content naturally—workers stack the slabs in such a way that air circulates between the separated layers of boards. Air-drying lowers the moisture level to between 12 and 17 percent. (This is acceptable for outdoor construction, but don't make any interior projects using air-dried material.)

Kiln-drying takes over where air-drying leaves off. Large ovenlike kilns with carefully controlled temperatures reduce the moisture content to between 6 and 9 percent, the ideal range for interior projects.

With few exceptions, such as dense woods like ebony, which usually are air-dried, retail hardwood dealers sell only kiln-dried lumber. It's stored, and sold, indoors under roof where the elements won't affect it.

When you purchase kiln-dried lumber, store it indoors lying flat on dry sticks of scrap or hardboard. Never lay it directly on concrete because it will absorb excessive moisture. If left exposed to the elements outdoors, kiln-dried lumber can become useless for fine cabinetry. In most cases, though, moisture absorbed will be of the surface type, and the boards will

Standardized Lumber Thicknesses and Uses

Thickness				Uses
Quarter Designation	Nominal	Actual	Pine	
5/8	5/8" material	1/2" or 7/16"	same	Laminating, drawer sides and backs
4/4	1" material	25/32" or 3/4"	same	Majority of work, face frames, shelves, and making up sides for width, jigs
5/4	1 1/4" material	1 1/16"	1 5/32"	Table and other tops, furniture parts
6/4	1 1/2" material	1 5/16"	1 13/32"	Moldings, leg to rail construction and bases
8/4	2" material	1 3/4"	1 13/16"	Framing members, table legs, workbenches, turning

return to their former dryness after storage time in the shop.

How Cabinet-Grade Lumber Is Sized
Unlike dimension lumber, which is milled to industry-established nominal thicknesses, widths, and lengths, most cabinet-quality stock comes in random widths and lengths to keep waste to an absolute minimum. In addition, since all furniture has different dimensions, there's no need for dimensionalized stock.

Thickness, though, has been standardized. As you can see from the chart above, thickness is expressed in different ways. Don't be confused by this; remember that the quarter designation and the nominal thickness are the same animal.

When you order cabinet-quality lumber, you'll receive a board as long or longer and as wide or wider than the item ordered. The thickness (if surfaced) will be close to that listed in the chart.

Lumber Grades

Grade	Characteristics
HARDWOODS **First and Seconds (FAS)**	The best grade. Boards usually 6" and wider, 8' and longer. Almost clear. Yields 83⅓ percent of clear face cuttings 4" or wider by 5' or longer and 3" or wider by 7' or longer.
Selects	Boards are 4" and wider, 6' and longer. One side is FAS, the other is No. 1 Common. Yields 83⅓ percent clear face cuttings.
No. 1 Common (Thrift Grade)	Boards are 3" and wider, 4' and longer. Economical alternative for some uses. Yields 66⅔ percent of clear face cuttings 4" or wider by 2' or longer and 3" or wider by 3' or longer.
SOFTWOODS **C Select and Better**	Minor imperfections.
D Select	A few sound defects.
3rd Clear	The best shop grade. Acceptable for cabinets. Well-placed knots allow for high percentage of clear cuts.
No. 1 Shop	More knots and fewer clear cuts than 3rd Clear.
Nos. 2 and 3 Common	The so-called shelving grades. No. 2 has fewer knots than No. 3

For more information contact:
National Hardwood Lumber Association, Box 34518, Memphis, TN 38134
Western Wood Products Association, 1500 Yeon Bldg., Portland, OR 97204

Buying by the Board Foot
Until the late 1800s, lumber was sold by the pound. Under that system, dry boards were less expensive than green wood. So obviously something had to be done.

The system of measurement that evolved centers around the *board foot*, a measurement that covers all the dimensional variables of cabinet-grade lumber — thickness, width, and length.

Today, when you purchase this type of lumber, you buy it by the board foot. Even if the dealer has the boards already priced, he arrived at those prices by first figuring the number of board feet each contained. It's a good practice to double-check the dealer's figures. To do this and also to help you estimate your lumber needs, you should learn how to figure board feet.

A board foot, simply, is equal to 144 cubic inches of wood. Think of it as a piece 1 inch thick and 12 inches square. Since board footage is always calculated in quarters of an inch thickness, starting at no less than 1 inch (even if you order less than an inch, you'll pay for the 1-inch thickness), a 5/4 board 6 inches wide and 72 inches long would be figured like this: 1.25 (thickness) ×6 (width) ×72 (length)=540. Divide 540 by 144 to determine the number of board feet in the stock. If the board length is stated in feet rather than inches, use the same method but divide your total by 12 instead of 144.

How Cabinet-Quality Lumber Is Graded
Unlike dimension lumber, which manufacturers grade according to its use in construction as full width and length members, hardwood is graded according to the expected number of clear face cuts a board will yield. And, since most hardwood is expected to be made into furniture, these cuts will be from 2 to 7 feet long. For more information on the hardwood grading system, which was developed by

Continued on page 94

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3 worthwhile accessories you can buy

Ripstrate

If you do a fair amount of ripping of stock to width, you might well want to invest in this terrific accessory. The Ripstrate holds the stock flat and tight against the fence for smooth, trouble-free work. It's easy to adjust for various stock thicknesses (in fact, one setting will handle most thicknesses you're likely to use) and it even has an antikickback device built in.

To use it, you have to make an auxiliary fence from a 2×4 or other length of straight board a couple of inches thick, with a couple of holes drilled in it to receive two metal posts on the base of the Ripstrate. After that, you just clamp the whole thing to your saw fence with a thumbscrew. You can position the rollers as shown in the photo, or even over the saw blade if you're ripping thin strips.

The Ripstrate works on radial arm saws as well, and can be positioned a number of different ways along the fence, depending on the width of the workpiece.

The price is $59.50 plus $3.50 shipping. You can order this accessory from Fisher Hill Products, 1 Fisher Hill, Fitswilliam, NH 03447. 603/585-6883.

Universal Jig

The universal jig lets you make precisely and safely all kinds of saw cuts that would otherwise be tough and dangerous to make—tenons, mitered tenons, half laps, and so forth. With the jig, you get two clamps and two small "fences" that can be bolted into the face through a series of holes, so your workpiece can be held in almost any imaginable position.

The base of the jig swivels as well, so the fence can be positioned parallel with the blade or at right angles to it, and as far from the blade as necessary to make the cut. A handy scale on the base helps you get it all lined up with a minimum of effort.

A bar secured to the underside of the base rides in the miter groove on the saw table to slide the work through the saw. The bar fits saws with ¾-inch-wide, ⅜-inch-deep miter grooves.

The jig is made from cast aluminum and has a knob on the back for easy handling. This product is a real temper and finger saver, and well worth the money. You can get one from Sears, catalog number 9 HT 3236. The price is $32.99 plus shipping.

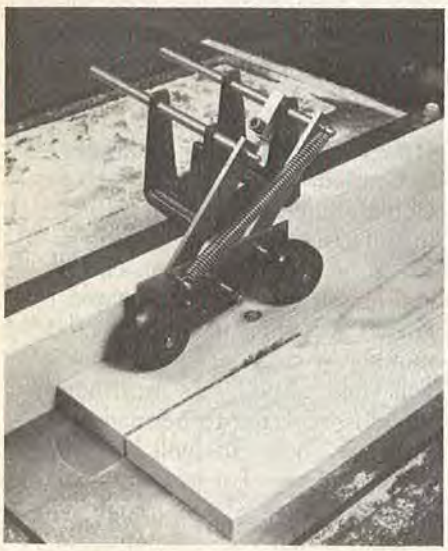
Biesemeyer T-Square Home Shop Saw Fence

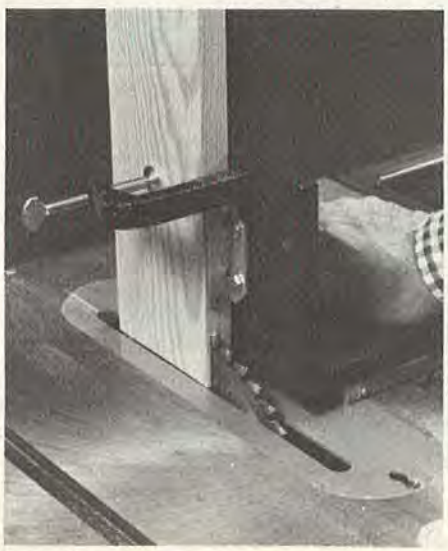
Until recently, making sure that the rip fence is aligned properly with the blade before making a cut was routine and time-consuming. But the folks at Biesemeyer now have a fence they say is accurate to within 1/32". We can't dispute their claim.

A less expensive adaptation of their contractor's fence, the Super 40 fits all brands of stationary table saws, and when properly adjusted, lets you set up for your rip cuts quickly and with confidence. You'll have to make an extension table and leg assembly to which to fasten the rails and guides (or order the parts from Biesemeyer).

When ordering, you need to specify the brand and model number of your saw, its blade size, and whether you want the fence to be to the left or right of the blade. Authorized Biesemeyer dealers will help you determine what you need.

Price for the 40"-cutting-capacity T-Square Home Shop Saw Fence System is $209 (table extra). Other sizes, systems available. At dealers or order from Biesemeyer Manufacturing, Inc., 216 S. Alma School Rd., #3, Mesa, AR 85202. Phone toll free 800/782-1831.





You may not be able to make beautiful music, but you can make these stylish hexagonal speakers!

handsome hexagonal speakers

NOTE: If you like the idea of a high performance speaker system, but don't care for the high-tech look of the ones we built, we've included the design alternative at right for you to consider. It's the same speaker enclosure with a base, grille fabric in the side openings, and a solid top. You also may want to use the same species of wood throughout to achieve a more traditional furniture look. The top shown could be leather, plastic laminate, or wood.

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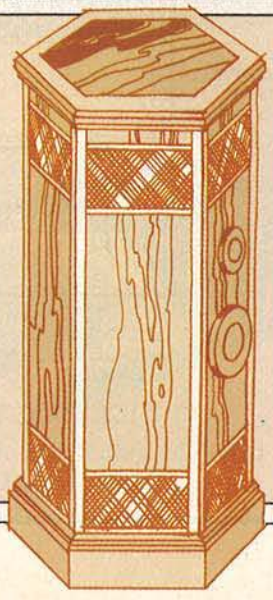
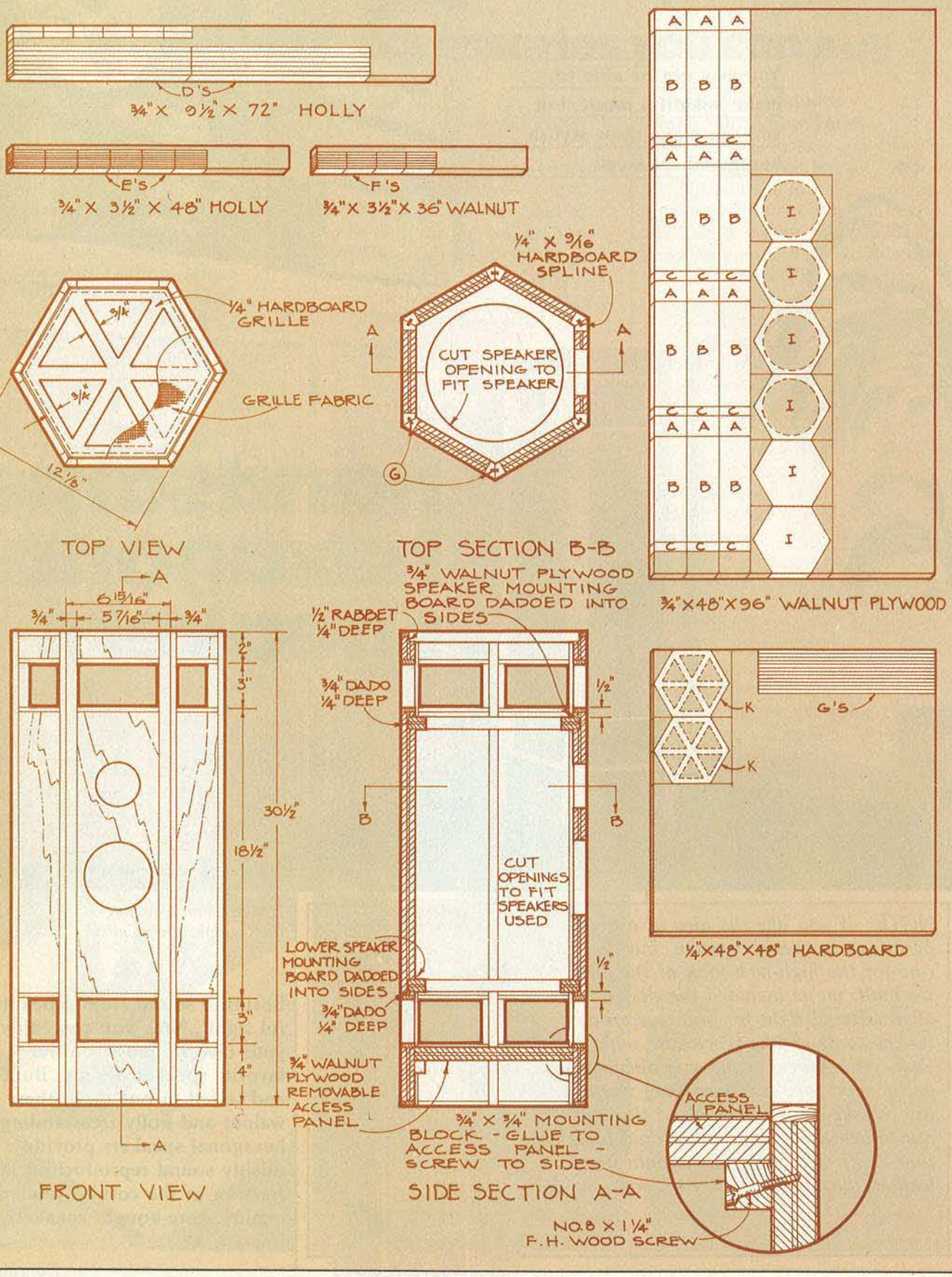


Design: Kim Downing
Photograph: Bob Calmer

Beautiful sound from a beautiful sight! Now you can enjoy your favorite music on our favorite speaker design. Built and tested in our shop, these walnut and holly freestanding hexagonal speakers provide quality sound reproduction at a fraction of the cost of similar-quality store-bought speakers.

Continued

Cutting diagram

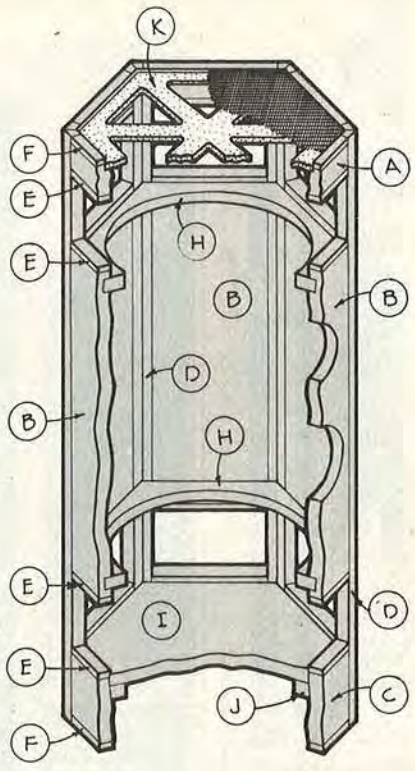


Bill of Materials (for 2 speakers)

Part	Finished Size*			Material	Qty.
	T	W	L		
A	¾"	5 7/16"	1½"	walnut plywood	12
B	¾"	5 7/16"	18"	walnut plywood	12
C	¾"	5 7/16"	3½"	walnut plywood	12
D	¾"	⅞"	30½"	holly	24
E	¾"	¼"	5 7/16"	holly	48
F	¾"	¼"	5 7/16"	walnut	24
G	¼"	9/16"	29"	hardboard splines	12
H	¾"	13"	13"	walnut plywood	4
I	¾"	13"	13"	walnut plywood	2
J	¾"	¾"	5"	holly	12
K	¼"	13"	13"	hardboard	2

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: 2–10" polypropylene air suspension woofers, 2–10" passive radiators (Radio Shack Optumus 10 40-2028), 2-soft dome midranges (sealed), 2-polypropylene tweeters (sealed), 2–3-way crossovers, white glue, 12–#8×1¼" flathead wood screws, grille fabric, penetrating oil finish, 1" acoustical insulation, spray adhesive, preformed bead caulking, staples (optional)



Cutting the Panel Pieces

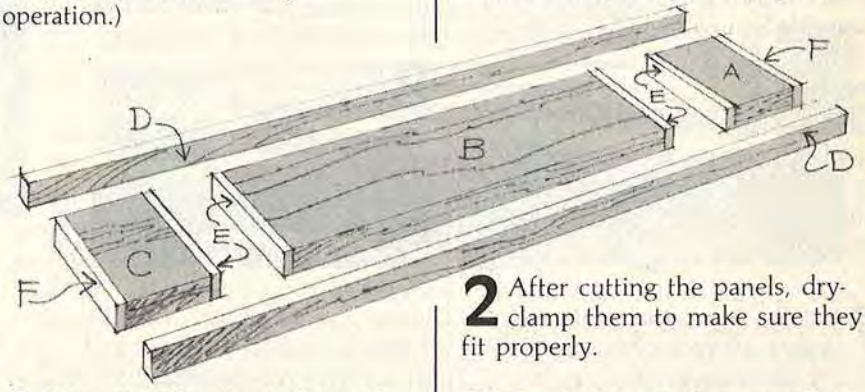
1 Start by ripping three 6" wide × 96" long pieces from the walnut plywood. (Before ripping, check the factory edge on the plywood; saw or joint it, if necessary.)

2 Crosscut each length into four 23⅞" lengths. Next, cut each length into pieces A, B, and C, using the cutting diagram for reference. (We used a stop block to make sure all the A's were the same length, and so on.) Note: To maintain flow of grain and uniform color, you'll want to keep the parts in the order shown in the cutting diagram.

3 Rip parts D, E, and F to width. Cut the holly edging (D) to 31½". Cut E and F to 6". Before you do, though, check the thickness of the boards you're using. If necessary, joint them down to the same thickness as the plywood.

Constructing the Panels

1 Glue the walnut and holly trim pieces (E,F) to the plywood pieces (A,B,C), sandwich-fashion (see the panel assembly sketch), using pipe clamps to exert pressure. (Make sure to keep the edging and plywood flush; we weren't careful enough and had to spend a lot of time routing the edging flush—a risky and time-consuming operation.)



2 Trim all holly-edged plywood panels to 5 7/16" wide.

3 Glue and clamp the holly edging (D) to the panels. We used 3" spacer blocks to ensure the correct spacing between each panel's sections.

4 Trim the panels to 30½".

5 Sand each panel smooth, being extremely careful not to sand through the walnut veneer.

Assembling the Enclosures

1 Find the vertical center of each panel and measure from the center point to mark the cutoff line

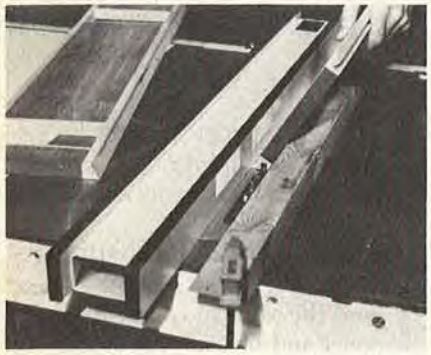
at both edges of each panel. (You want to have ¾" of holly edging on each side after cutting.) Before bevel-ripping the panel's edges to 30 degrees, check for proper angle of cut by making some test cuts on scrap stock and by clamping up with a web clamp as shown in the photo above. Adjust and recut, if necessary. Also, check the alignment of the rip fence to the saw blade to ensure a parallel rip.

2 After cutting the panels, dry-clamp them to make sure they fit properly.

3 Cut ¼" stopped grooves 5/16" deep in the holly edging, as

Continued

shown in the photo below, to receive splines. Cut them to within 1½" of the top of the panels and all the way to the bottom.



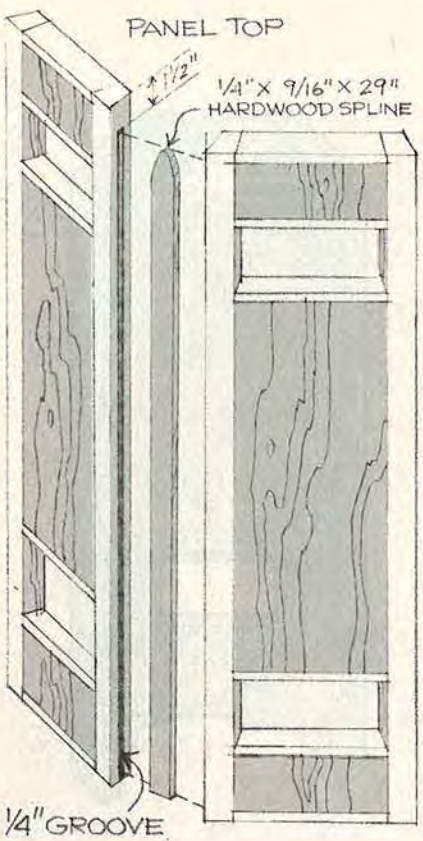
4 Cut a groove to accept the speaker wires along one edge of one panel as shown in wire groove detail. See page 94.

5 Cut a ½" rabbet ¼" deep across the top of each panel as shown in photo below. Also cut

¾" dadoes ¼" deep to accommodate the speaker mounting boards. (We used a stop on the radial arm saw when dadoing to ensure dado alignment for glue up.)

6 Cut twelve ¼"×⁹⁄₁₆"×29" splines (G). Shape the top of each spline to conform to the shape of the top of the spline groove (see spline detail at the top of the next column).

7 Cut the hexagonal mounting boards (H) to 13" square. To cut the hexagon, set the dry-clamped cabinet upside down on the 13" square walnut plywood and



SPLINE DETAIL

trace the inside rabbeted dimension. Cut the marked hexagonal line, and then cut out the center to fit the speaker. Trim off the corners of the mounting boards to allow for splines. Check the fit of the mounting boards in the dadoes. (We found that for easier gluing and clamping, it's best to cut the mounting boards slightly undersize to allow for some play from side to side.) Notch one corner of the bottom mounting board to allow the speaker wires to pass through.

8 Re-clamp the cabinets dry before gluing to check for proper fit of the bevel joints, mounting boards, and splines.

9 Glue up the speaker enclosures, using 6 band clamps per unit as shown in the photograph. We used white glue to allow for additional working time to assemble and clamp the units together. We also found it helpful to have an extra pair of hands available for this step.

(Be sure to place waxed paper under each band clamp so the glue doesn't make contact with the clamp straps.)

Finishing Touches

1 Remove the clamps and the excess glue, then sand the enclosures (inside and out) smooth.

2 Lay out and cut the removable bottom access panel (I). To do this, place the cabinet right-side-up on a 13" plywood square and trace the inside dimension. Cut the marked line and then cut the glue blocks (J) to size. Glue the blocks to the access panel and screw mount to side panels as shown in access panel detail. See page 70.

3 Finish as desired. To lessen the chances of the enclosures warping over time, be sure to finish both the inside and outside. We used Watco Danish Oil.

4 Lay out and cut the ¼" hardboard grille (K) to size. Spray paint the grille black and cover it with black grille fabric. We used a spray adhesive to attach the fabric to the hardboard grille.

5 Cut holes in the vertical panels to accept the speakers. Wire

Continued on page 94

Vienna Regulator Wall Clock

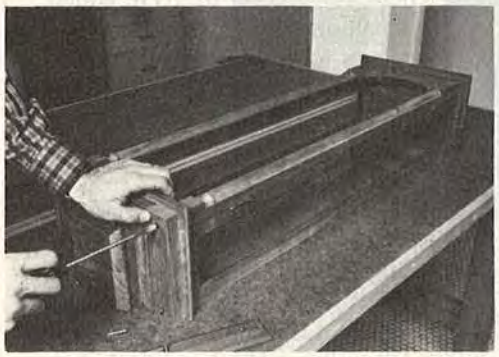
A regular feature, Kit Builder is compiled on the basis of our shop experience in actually assembling the products we feature. In addition, we evaluate them on the following: quality of assembly instructions, quality of materials, and how well the parts are machined.

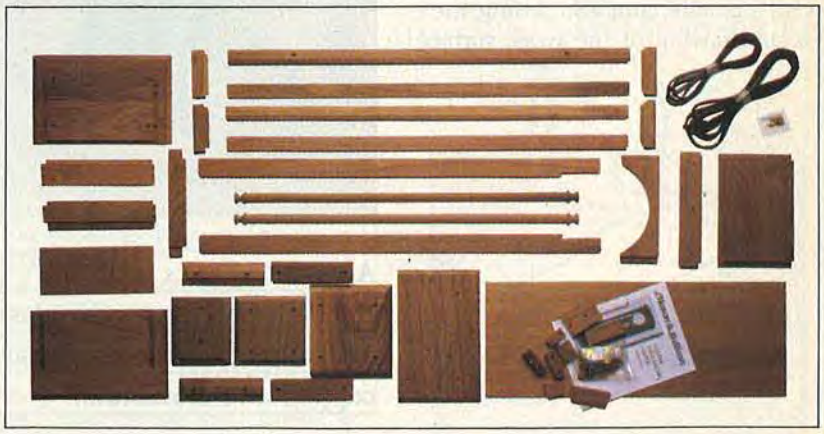
Print this article

When it comes to instructions, Mason & Sullivan must have written the book. The instructions for their Vienna Regulator Wall Clock were easy to read, understandable, and took us through assembly step-by-step. Additional helpful information included diagrams of screw sizes, drill bit sizes for starter and clearance holes, and (for the novice) some handy definitions of applicable woodworking terms. There's also an exploded-view drawing accompanying the parts list and several more sketches to help explain the step-by-step. The hints and advice for pre-assembly are nice touches, too.

Checking off what came in the UPS-shipped kit package, we found there were a few extra parts over what was actually needed—hinge screws, brads, and wood plugs. To our disappointment, one of the machined walnut base pieces was misshaped, but a telephone call resulted in a no-argument replacement, which took five days to receive. The rest of the walnut cabinet parts were of excellent quality, without imperfections. With one minor exception—removing less than 1/32 inch off a rabbet to get a tight fit—the parts went together without a hitch.

Besides sandpaper to finish the wood, we needed an assortment of spring, bar, and C-clamps, plus a square, rule, awl, chisel, screwdriver, drill bits, and drill to complete the assembly. The manufacturer recommends using a slow-drying, liquid resin wood glue. Let it set the pace; you won't want to hurry through this kit. ■





This kit is available from Mason & Sullivan Co., Dept. W, 586 Higgins Crowell Road, West Yarmouth, Cape Cod, MA 02673. Telephone (617) 778-0475.

Cost of kit 7672 is $234.50 plus $7 to $15 shipping. Glass, dial, and movement are extra. Free catalog upon request.

FOOT-POWERED coping saw

A back-to-basics tool that's great for cutting thin woods, plastic, and soft metals such as brass, copper, and aluminum.

Print this article

The Saw Table Assembly

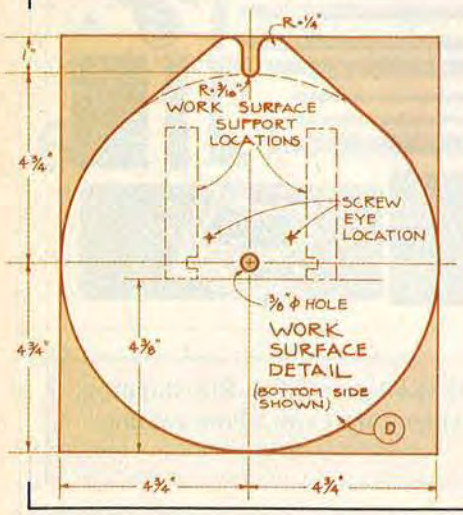
1 Rip a 4½"-wide × 14"-long section from your board. Then, cut a ¼" groove ¼" deep and ¼" from one edge of the material.

2 Crosscut the material into two 6¾"-long pieces (A). Notch these parts as shown.

3 Cut parts B and C to size, then form the tongues on B by cutting ¼"-wide rabbets ¼" deep along each edge. (We put a slight chamfer on the edges of the tongues to prevent part B from binding the groove cut into parts A.) Round the ends of C as directed in the exploded-view drawing.

4 Glue and screw parts A and C together (be sure to maintain the 2¾" space between the inside edges of the A parts).

5 Cut the work surface (D) to size. (*Note:* We edge-joined several narrower pieces of the stock together—alternating the end grain—to prevent possible cupping). Using the detail drawing of the work surface as a guide, draw its shape on the edge-joined boards. Then, cut the surface to its final shape with a saber saw or band saw. Sand as necessary.



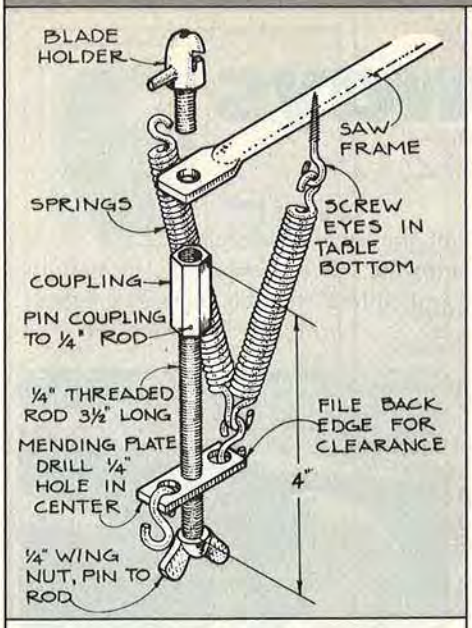
6 Apply plastic laminate to the bottom side of the work surface (D), then draw a line across its width, about 4⅜" back from its front edge. Clamp the work surface to the A-C subassembly (align the front edge of the subassembly with the mark you just made and check to make sure there's a 2¾" space between the inside edges of A). Drill a pair of pilot holes through the work surface into each of the work surface supports (A). Glue and screw the parts together. Let the glue dry.

7 Drill a ½"-diameter hole lengthwise through the center of B. Then cut notches in the top and bottom to accept the saw frame and the mending plate.

8 With the table upside down, slip part B into the grooves in part A to check for a good fit. (We added a small amount of paraffin to the grooves to ensure smoother sliding.) Insert a pencil in the ½" hole in the slide, and mark for a hole in the underside of the work surface.

9 Cover the top side of the work surface with plastic laminate, then using the guide mark on the underside of the work surface, drill a ⅛" pilot hole through it. Now, drill a ⅜" hole from the top side to prevent chipping. Drive the two screw eyes into the bottom of the work surface where shown.

10 Prepare the threaded rod as shown in the detail, then run it up into the hole in the slide. (The



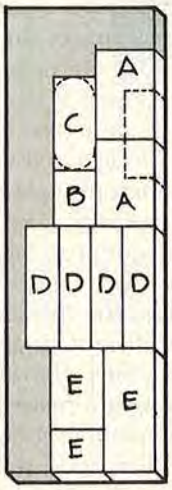
mending plate will fit into the notch you cut earlier.) Fit the slide into its grooves, then position the saw frame and screw it to the coupling.

11 Hang one of the S hooks from the mending plate and stretch the two springs between the S hook and the screw eyes.

The Treadle

1 Laminate the treadle (E) as shown in the exploded-view drawing.

Cutting diagram



¾"X 11¼" 36" MAPLE

2 Outline and cut the bottom of the laminated stock so it will rock on the ball of the treadle. Next, cut the treadle to fit your shoe.

3 Drill a ¼" hole through the width of the treadle (E), and fit it with the 6" eyebolt. (A nut on both sides of the maple block holds the eyebolt in place.)

4 Measure the leather strap so it will fit around your shoe and will attach to both sides of the treadle. (Your shoe should fit snugly in the treadle and yet be able to be taken out with ease when you're done cutting.) Attach the leather strap with brass screws and finishing washers.

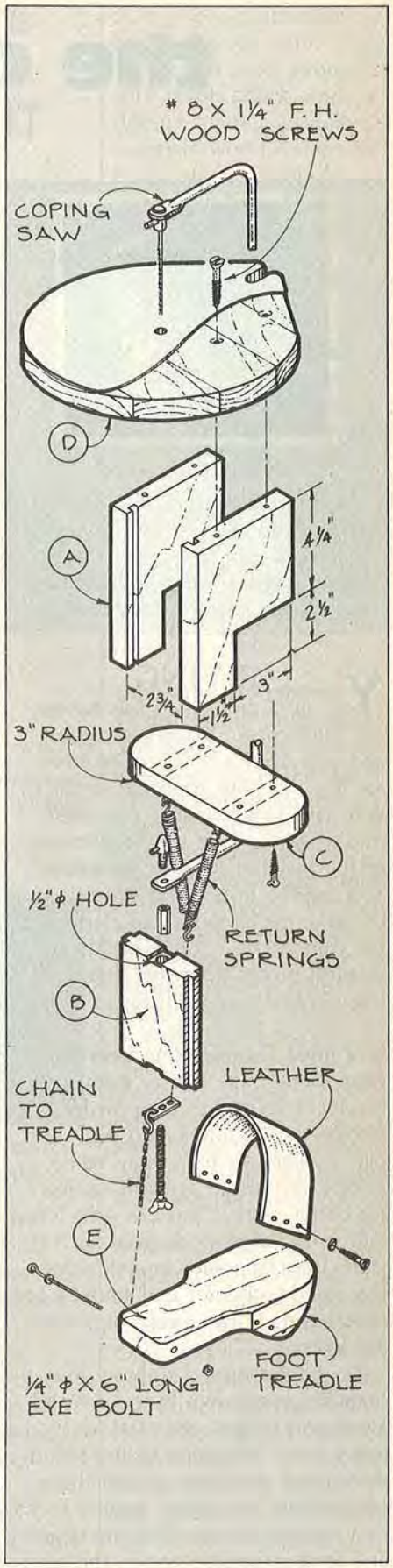
NOTE: To use the saw, fasten it to a workbench top with clamps. Connect one end of the chain to the hole in the mending plate and the other end to the eyebolt on the treadle via S hooks. Place your foot into the treadle and gently rock it (this will move the coping saw up and down). ■

Bill of Materials

Part	Finished Size*			Material	Qty.
	T	W	L		
A	¾"	4½"	6¾"	maple	2
B	¾"	3 3/16"	4⅜"	maple	1
C	¾"	3"	7¼"	maple	1
D	¾"	10½"	9½"	maple	1
E	1⅞"	4¾"	11½"	maple (lam.)	1

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: 1—Stanley coping saw (#15-104), 1—¼" wing nut, 2—¼" nuts, 2—⅜"×3¾"-long 18-gauge springs, 2—⅝" screw eyes, 1—2-hole Stanley mending plate (1/16"×⅝"×1⅞"), 1—40" brass safety chain—size 0 (2 links/inch), 6—#5 brass finishing washers, 6—#8×1¼" brass flathead wood screws, 8—#8×1¼" flathead wood screws, 1—¼"×6"-long eyebolt, 1—¼" diam. × 3½"-long threaded rod, 2—1" S hooks, 1—¼"×⅞"-long coupling, plastic laminate, contact cement, ⅛"×3"×11¼" leather scrap, woodworker's glue, paraffin



the old hand ways

THE PIONEER—PART 2

Print this article

By Roy Underhill

Master housewright at Colonial Williamsburg, host of the highly successful P.B.S. series "The Woodwright's Shop," author, lecturer, and master craftsman.

RIVING

You are a pioneer in the American wilderness. Winter is coming and you need a house. The trees are big and your tools are small, so you have to be smart. You must find a way to turn the very nature of the material to your advantage. You use the fastest and easiest way to make the shingles and clapboards for your house. You make these smallest pieces from the largest trees, entirely by splitting.

You must choose your trees with care. Some, like elm or gum, can barely be split with gunpowder. Others that ordinarily do well, like oak, cypress, or pine, may be so knotty or twisted as to be useless for better work. You can split fence rails or building studs from such stuff, but clapboards and shingles that need to be flat and smooth can only be made from very big, very old trees.

Knots, the buried stubs of low branches overgrown by new wood, await you in the core of almost every tree. The grain of the wood must bend and flow around these obstructions like water around rocks in a rushing stream. But the larger and longer the tree grows, the more the wood becomes like a deep flowing river: straighter, clearer, and more workable. You must learn to "read" the tree for the signs of these flaws that show as irregularities or spiraling in the bark.

You want to work the timber while it is still fresh. Wood works much easier when it is green, requiring only about two-thirds the effort to split as when it is dry. In addition, a log left lying around for very long is considered fair game by the bugs. Even the nicest-looking shingles won't do you much good if they are full of woodworm holes.

Once the tree is on the ground and crosscut to the appropriate lengths, you split the cylinder down the middle by driving an iron wedge near the edge of one end until the crack begins. After it's started, the crack may be continued by using "gluts," wedges made from dogwood or other tough stuff. With the log in half, continue to halve each of the pieces until they match the thickness of your upper arm. This is the size that is best worked by the long-handled wedge most commonly known as the froe.

The froe lives two lives. When you drive the dull blade into the end grain of the wood, it is working like a wedge. Driven in to the point where you can't strike it with the club any more, you continue the split down the length of the wood by using the froe as a lever, pushing or pulling the long handle to one side or the other. This simple leverage gives you the strength of ten.

Splitting wood may seem to be a "wild" process, one that, once begun, is uncontrollable. Splitting does tend to follow the natural grain of the wood, and this is one of the great advantages of the process. The strength of the grain is kept intact and the surfaces created are less permeable to water. To some extent, however, you can control the direction of the split as it progresses down the length of the wood. By bending one side of the wood more than the other, the split may be redirected to that side.

Oak splits best for shingles radially, across the growth rings. Cypress is just the opposite, and is riven out "flat" or tangential to the rings.

Shingle and clapboard makers commonly use a big forked limb, sometimes called a riving break, for this purpose. As you work the froe down the length of the wood, you place the thicker side down and push on it to give it an extra bend. You need this control to prevent ruining a piece by having the split prematurely "run out" to one side. This is good work, for spirit as well as body. Even Albert Einstein once commented that "Everyone likes to split wood—one sees the results immediately."

Continued on page 90

WALNUT
The aristocrat of woods

Elegant and distinctive, rich in color and figure, and with working properties unequaled, walnut is reserved for the woodworker's finest projects. What's behind this exalted position and the matching price?

Paul L. McClure

Wood technologist, lecturer, owner of Wood World, a retail hardwood store in Tempe, Arizona, woodworking instructor, and former exotic hardwood buyer.

Brief History

Walnut was prized by the Mediterranean civilizations, not for its wood, but for the abundance of nuts the trees produced. During the Roman conquests, it was planted in what is now England, France, and Spain for this reason.

American pioneers used native walnut to make waterwheels and charcoal for gunpowder, and its bark and nut hulls for cloth dyes. Through World War I, airplane manufacturers found walnut to their liking for propellers.

While walnut was used to some extent for furniture, gunstocks, and other items prior to the 1600s, it was William and Mary furniture that cast it into the perpetual limelight.

Wood Identification

Of the 15 or so species of walnut found from China to the Black Sea, only three enjoy commercial importance in the United States. English Walnut (*Juglans regia*), a light-colored, yet beautifully patterned wood, is grown primarily for its nut crop. White walnut (*Juglans cinerea*), commonly called "butternut," though not as strong as other walnut species, has an attractive grain and working characteristics that make it a favorite with wood carvers. Black walnut *Juglans nigra*), the most recognizable and famous, continues to hold down its place as the world's premier cabinet wood.

All walnut has very white sapwood. Partly to darken the whiter sapwood to a uniformly dark color, kiln operators who process black walnut steam it prior to kiln-drying. This additional processing also makes the wood easier to stain, and adds to its cost.

Costly also are the veneers made from black walnut's great variety of figures—crotches, swirls, stumpwood, and burls.

Burl grain | Straight grain | Book-match grain

Working Properties

Once kiln-dried and made into furniture, walnut has a very low contraction and expansion ratio. While it is hard, strong, stiff, resists shock, and doesn't splinter, walnut surprises woodworkers by being quite suitable for steam bending. Walnut also works easily with both hand and power tools, and sands and finishes extremely well.

Uses in Woodworking

All commercial species of walnut have the desired properties for fine furniture, architectural woodwork, turning, and carving. Since walnut is highly shock resistant, it remains the traditional choice for gunstocks. And figured walnut veneers are popular in marquetry.

Cost and Availability

White walnut (butternut) and black walnut are commonly available through hardwood dealers, though black walnut normally comes in narrower and shorter lengths than other domestic lumber. Black walnut falls in the high-priced category due to demand, relative scarcity, and processing. At publication time, kiln-dried black walnut ranges between $3.50 and $5 per board foot for 4/4 stock (depending upon where you live), while butternut is $1 less per board foot.

Source of Supply

The best black walnut comes from Illinois, Indiana, Iowa, Kentucky, Missouri, Ohio, and Tennessee. Butternut grows from Wisconsin and Illinois eastward into the New England states. English walnut follows the same range, but the largest groves are in California, where nuts are commercially harvested. ■

Print this article

8 GREAT GIFTS YOU CAN BUILD IN A WINK (OR TWO)

Print this article

The holidays usually get hectic — especially for woodworkers. With all those last-minute gift requests, you can fall behind schedule before you know it. Our in-a-hurry gift ideas will take the heat off — fast!

4-pack

1 Using a 2×8, cut part A to size. Round off all the sharp edges and corners, then sand the entire block smooth.

2 Transfer the pattern from the drawings to 1" grid paper, then use carbon paper to transfer the design to the stock. Locate all axle holes, window holes, and cut lines.

Design: Steve Baldwin
Photograph: George Ceolla

3 Drill 5/16" axle holes and ½" window holes.

4 Cut out the cars, using a band saw with a ⅛" blade. Work slowly and cut right on the line.

5 Transfer the pattern for the handle (B) onto a piece of contrasting stock and cut it out. Round off the handle edges with a rasp. Sand the cars and the handle; set them aside.

6 Add interest to the cars by making the 1¼" wheels (C) from a contrasting wood. Using a 1½" hole saw, cut through the stock until the ¼" pilot bit of the hole saw penetrates the opposite side of the stock. Remove the hole saw, then flip the stock over and finish the cut.

7 Glue and clamp the carrying case back together at the entry cut. After the glue has set up, remove the clamp, then drill and peg the seam with a ¼" dowel.

Clamp the handle to the case and drill ¼" dowel mounting holes. Remove the handle and apply glue to the flat surfaces and to the dowels and glue the handle in place. After the glue has dried, sand the handle dowels and the seam dowel flush.

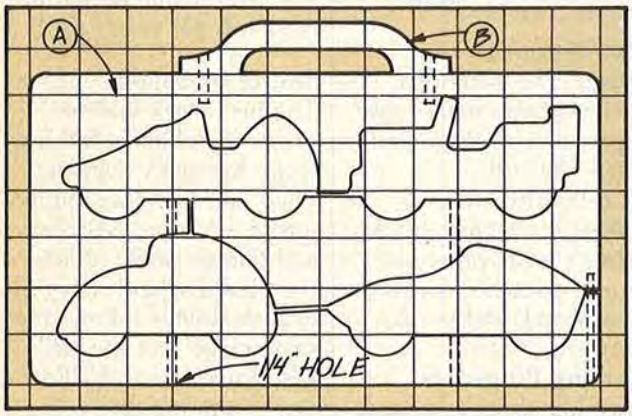
8 Drill ¼" holes in the case. Insert cars and mark for catches, then drill ⅜" holes in the bottom of the cars to accept the catches. Plug the holes in the case with dowels.

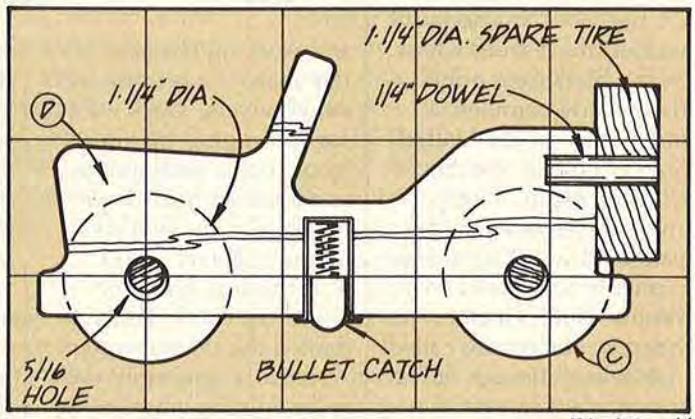
9 Insert the axles (D), glue the wheels to the axles, and sand them flush after the glue has dried. Apply a nontoxic finish. Insert the bullet catches. ■

Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	1½"	6½"	12"	light wood	1
B	¾"	1⅜"	5¾"	dark wood	1
C	½"	1¼" dia.		dark wood	17
D	¼" dia.		2⅝"	hardwood	8

Supplies: ¼" dowel rod, 4—bullet catches (available at hardware stores) (for ⅜" hole)





spiffy spice rack

Design: Marlen Kemmet
Photograph: George Ceolla

The Spice Containers

1 Cut the A and B pieces to size, as dimensioned in Bill of Materials, then glue and clamp up two 32"-long sandwiches, using two A's and one B in each sandwich. Carefully align all the pieces, and clamp at 4" intervals.

2 After the glue dries, remove the clamps and sand all surfaces. Trim the 2½" dimension to 2¼" to square your sandwiches. Now, cut each into seven 4"-long sections.

3 Draw diagonal lines from opposite corners on one end of each container to find the center point. Then, fashion a jig like the one shown below, clamp the jig and the containers as shown, and bore a 1¾" hole 3" deep in the center of each container.

4 Clamp each container to a table, and using a ½" round-over router bit, round all the exterior edges.

5 Sand all surfaces smooth and label each container with dry-transfer lettering.

6 Finish all exterior surfaces with two or more coats of polyurethane varnish, sanding between coats with 0000 steel wool (be careful not to damage the lettering). Leave the interior unfinished or finish with cooking oil.

The Rack

1 Cut C, D, E, and F to size. (You'll need to resaw the F pieces to ¼" thickness.)

2 Cut ¾" dadoes ¼" deep in the C pieces as shown in the drawing. Fit the shelves (D) into the dadoes to check for a good fit. Then, glue and clamp pieces C and E together and allow the glue to dry. Scrape all surfaces smooth. Scribe a 1¾" radius on the top corners of the rack ends. Rough-cut the corners with a band saw, then smooth with a belt sander or disk sander. Now, rout the edges of the uprights with a ½" round-over bit.

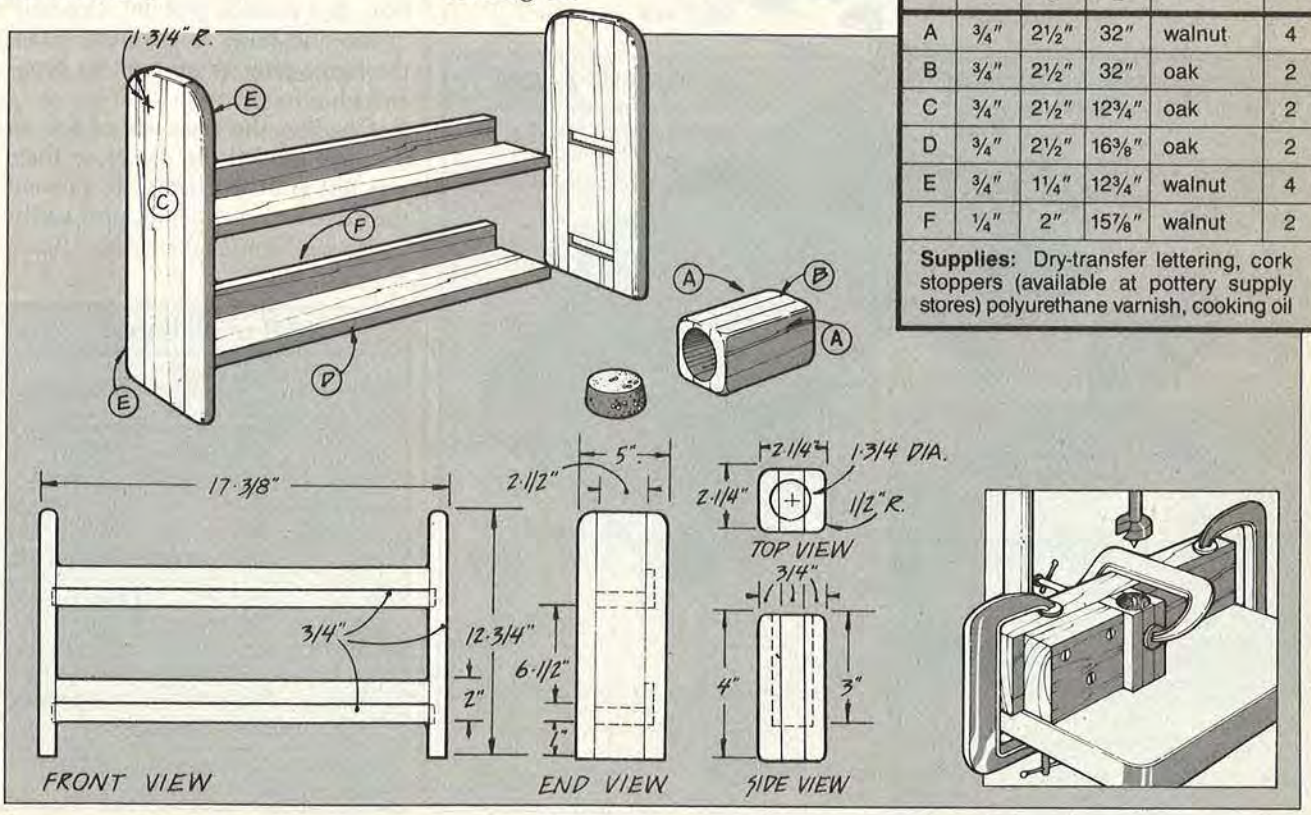
3 Glue and clamp the shelves between the ends, and do the same to the shelf uprights (F). Allow the glue to dry.

4 Sand all surfaces smooth with 100-, 150-, and 220-grit sandpaper. Remove any dust with a tack cloth, and finish the rack with two or more coats of polyurethane varnish. ■

Bill of Materials

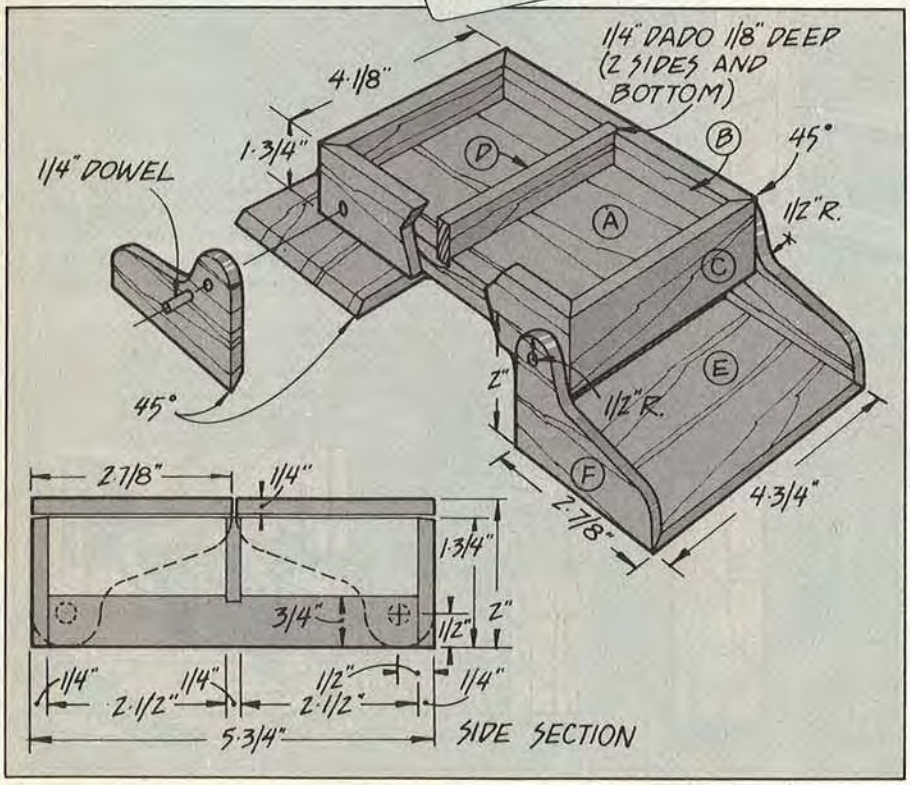
Part	Finished Size T	W	L	Material	Qty.
A	¾"	2½"	32"	walnut	4
B	¾"	2½"	32"	oak	2
C	¾"	2½"	12¾"	oak	2
D	¾"	2½"	16⅜"	oak	2
E	¾"	1¼"	12¾"	walnut	4
F	¼"	2"	15⅞"	walnut	2

Supplies: Dry-transfer lettering, cork stoppers (available at pottery supply stores) polyurethane varnish, cooking oil



playing card box

NOTE: You'll need some ¼" walnut and oak stock to complete this project. You can either resaw or plane thicker stock to size or special-order the ¼" material. We ordered ours from Constantine's, 2050 Eastchester Road, Bronx, NY 10461.



1 Cut the box bottom (A) and divider (D) to size. Cut the sides (B) and ends (C) to size, plus 1" in length. Then, cut dadoes in parts A and B to accept the divider.

2 Miter-cut the ends of B and C (to finished length) then dry-fit the box parts to check for a good fit. Glue and clamp the box together.

3 Cut E and F to size. (We cut the two top pieces (E) from the same piece of material to ensure a pleasing, continuous grain pattern.) Mark the curves on the side pieces (F) as shown and cut to the finished shape. Mark the ¼" hinge pin location in F and drill.

4 Bevel-cut the top pieces and the sides. When you're sure of a good fit, glue and clamp the covers. To clamp the covers, we planed down a 2×4, wrapped it in waxed paper, then glued and clamped the cover pieces to the 2×4 and to each other.

5 After the glue has dried, remove the clamps and set the covers on the box assembly. Mark the ¼" hinge pin position through the holes of the covers onto the box, remove the covers and drill ¼" into the box. Put a small amount of paraffin in the drill holes in the box. Cut the hinge pins, dry-mount to box, and glue to cover.

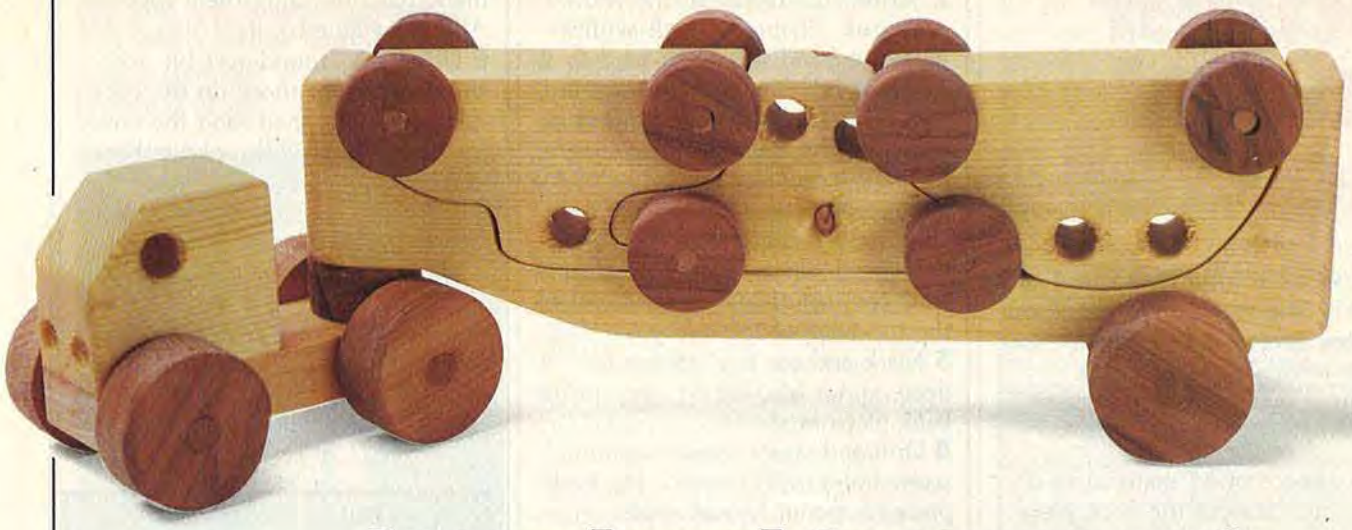
6 Chamfer the top ends of the box (C). We sanded the pieces so there was just enough friction to prevent the covers from opening too easily. Finish-sand the card box and finish with oil. ■

Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
A	¾"	3⅝"	5¼"	walnut	1
B	¼"	1¾"	5¾"	walnut	2
C	¼"	1¾"	4⅛"	walnut	2
D	¼"	1⅛"	3 13/16"	walnut	1
E	¼"	4¾"	2⅞"	oak	2
F	¼"	2"	2⅞"	oak	4

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: woodworkers glue, ¼" walnut dowel



long-haul transport

Real-life over-the-road tractor/trailer rigs fascinate most kids. This pint-size transport should prove equally intriguing, as your favorite young'un wheels it to all sorts of imaginary destinations. It's made mostly from scrap 2×4.

1 Cut parts A, B, and C to size and sand all the surfaces smooth. Next, transfer the pattern from the drawings to tracing paper, then use carbon paper to transfer the pattern to the stock. (Be sure to locate all holes on the stock.)

2 Drill the 5/16" axle holes and the ½" window holes for the cars. Then, drill the 5/16" headlight holes and ½" window holes for the cab. Back up the stock with scrap wood to prevent chip-out while drilling.

3 Using a band saw or jigsaw, cut the cab to its final shape. Glue and clamp the cab to the base. After the glue dries, sand the cab, then drill the 7/16" axle holes.

4 Cut out the trailer body and cars, using a band saw with a ⅛" blade or a jigsaw. Cut the axle support out of the waste stock from the front of the trailer. Glue and clamp the support to the trailer, then sand the trailer and all the cars.

5 Drill a 7/16" axle hole for the trailer axle, then drill the ⅜" hole for the hitch pin.

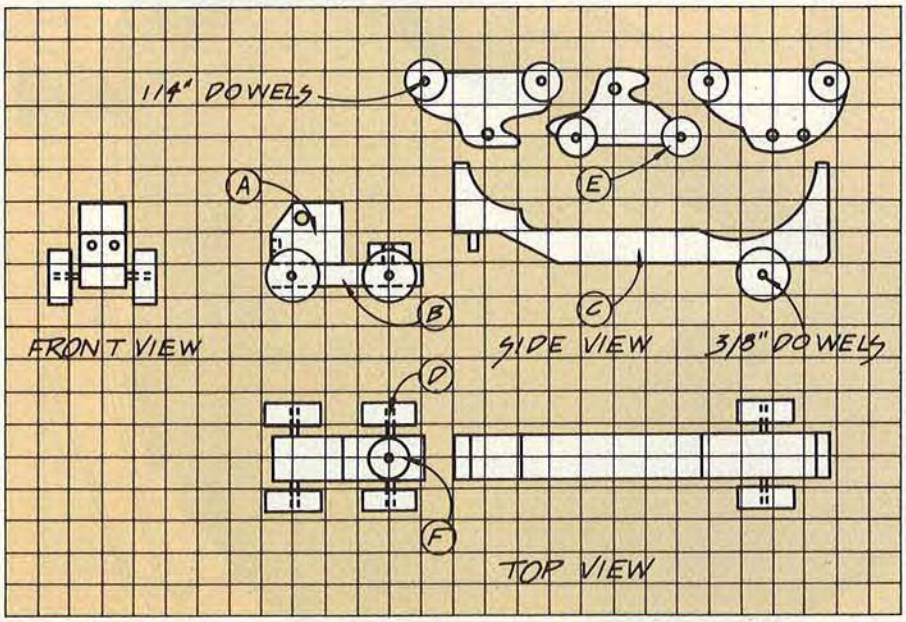
6 Cut the truck, car, and fifth wheels (D, E, F) to size.

The quickest way to make wheels is with a hole saw. Use a 2" hole saw for the truck wheels (D) and a 1½" hole saw for the car wheels (E) and the fifth wheel (F). Since hole saws have a ¼" pilot, you'll need to drill out the truck wheel holes to ⅜" and the fifth wheel hole to 7/16".

Insert all axles, then glue all the wheels to the axles. Sand flush.

7 Finish this toy with two coats of a nontoxic finish such as salad bowl finish or mineral oil. ■

Design: Steve Baldwin Photograph: George Ceolla



Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	1½"	2"	2¼"	pine	1
B	1½"	¾"	4¾"	pine	1
C	1½"	3⅛"	11¾"	pine	1
D	¾"	1¾" dia.		dark wood	6
E	½"	1¼" dia.		dark wood	12
F	⅝"	1¼" dia.		dark wood	1

Supplies: woodworker's glue, ⅜" and ¼" dowel rod, nontoxic finish

Continued

paper towel holder

We've been kidding around calling this "the world's easiest woodworking project." But it's also one of the most useful, whether stationed in a garage or a workshop.

1 Rip a piece of ¾" material to 4" wide, then crosscut the back piece (A) and the two end pieces (B) to length.

2 Scribe a 2" radius at one end of each part. Shape the ends with a jigsaw or band saw, then sand as necessary. Using ⅜" round-over bit, rout the edges of the end pieces as shown in the round-over detail. At the center point of the radius of the end pieces, bore a 1" hole ⅜" deep. To allow for easy removal of the dowel rod, cut a 1" dado ⅜" deep from the top of one of the holes to the top edge of the end piece.

3 Mark and cut a ¾" rabbet ⅜" deep, and a ¾" dado ⅜" deep in the back piece as shown.

4 Drill and countersink mounting screw holes in the face of the back piece to mount to wall studs.

5 Dry-fit the parts to check them for proper fit, trim if necessary, then glue and clamp them together. Allow the glue to dry.

6 Using a ⅜" round-over bit, rout all edges except those on the back side of part A, then sand the entire assembly. Coat with polyurethane varnish or other durable finish.

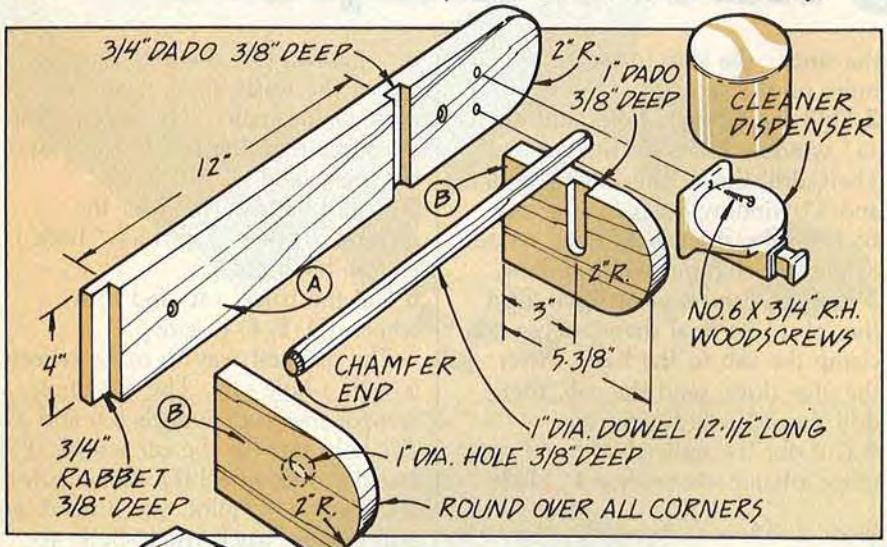
7 Mark the position of the cleanser dispenser screw holes, then drill pilot holes. Mount the dispenser with brass screws.

8 Measure and cut the dowel (C), check for fit in the holder, chamfer one end, sand, and insert. ■

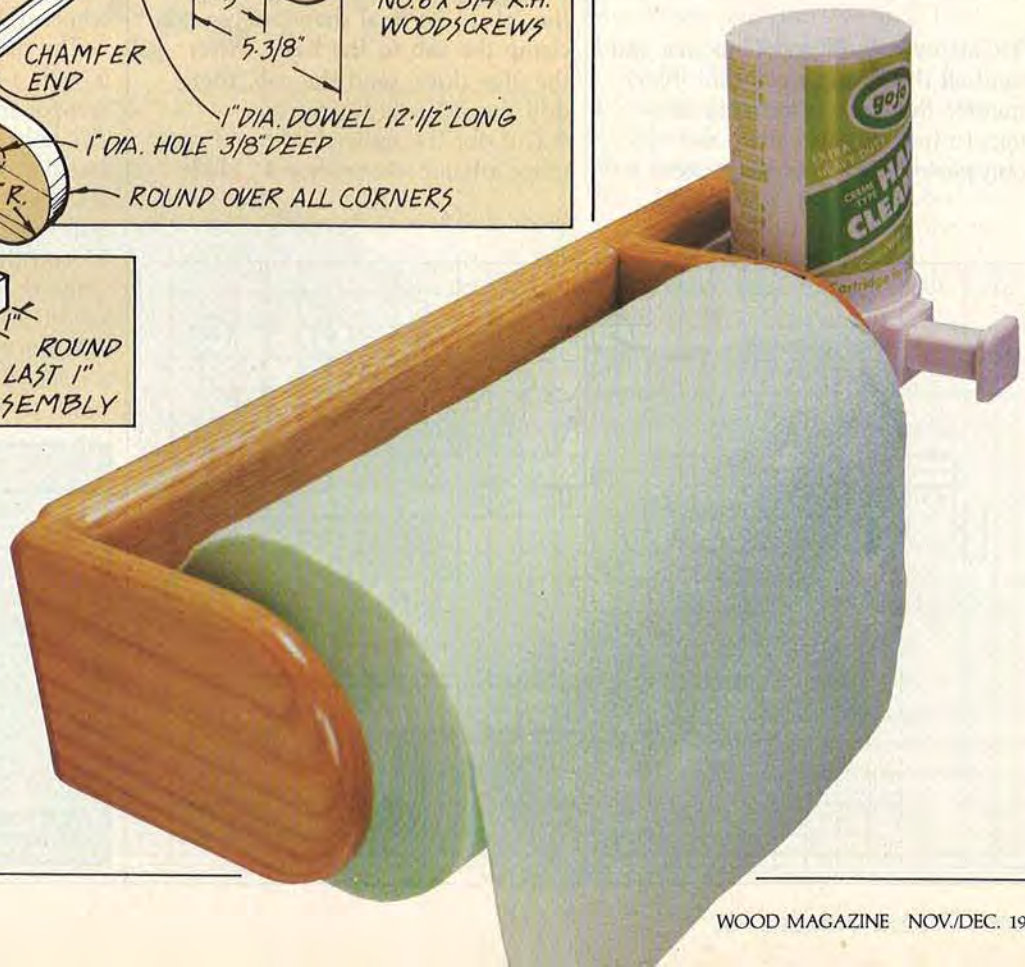
Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	¾"	4"	19½"	oak	1
B	¾"	4"	5⅜"	oak	2
C	1" dia.		12½"	birch dowel	1

Supplies: 2—#6×¾" brass roundhead wood screws, woodworker's glue, polyurethane finish, hand cleaner, and dispenser



ROUND OVER DETAIL



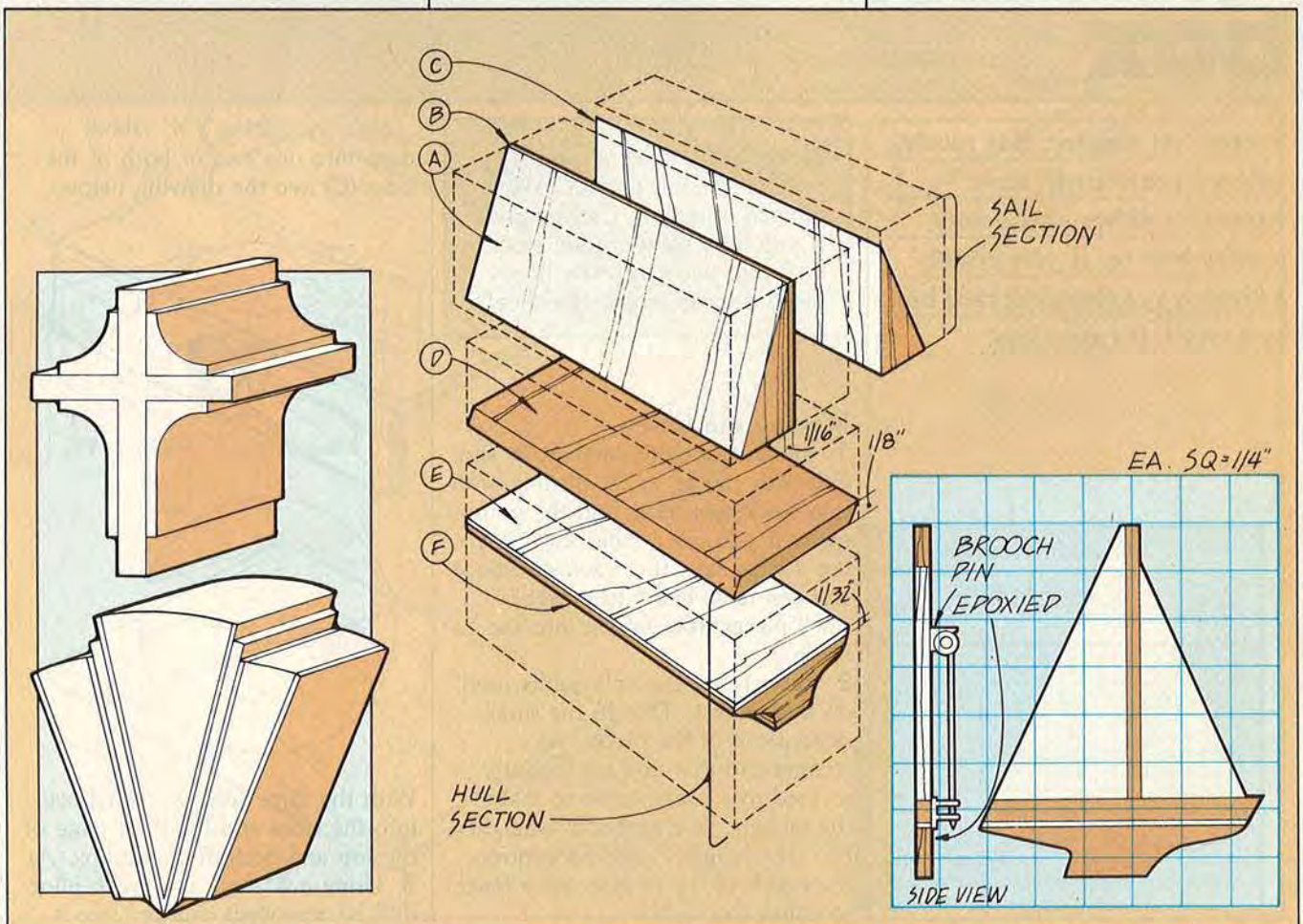
sailboat pins

1 Cut all parts to size as indicated in Bill of Materials.
2 Apply epoxy and clamp A to B, and E to F. After the epoxy dries, rip B to 1/16" and E to 1/32" (we used a band saw for this). Apply epoxy and clamp C to the A-B assembly and D to the E-F assembly. Let epoxy dry, and rip D to 1/8".
3 Sand the bottom of the sail section smooth, then clamp and epoxy it to the hull section.
4 Transfer the full-size design to tracing paper, then use carbon paper to transfer it to the laminated stock.
5 Using a jigsaw, coping saw, or band saw with a 1/8" blade, cut the marked lines to obtain the boat's profile. (We used a small hand screw clamp to hold the stock when cutting to keep our fingers away from the blade. We also used relief cuts in some places, as a few angles are too tight to negotiate in one pass. Hand-sand all of the surfaces smooth.
6 Saw off the 1/8" pins. Then, finish-sand them and attach a brooch pin to the back side of each with epoxy. After the epoxy has dried, apply a lacquer finish to the pins. (We polished a few of the pins we made using Micro-mesh™, a fine-cutting abrasive product that polishes wood surfaces to a high luster. See page 35 for more information. ■

Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	3/4"	3 1/4"	1 1/2"	poplar	1
B	3/4"	3 1/4"	1 1/2"	rosewood	1
C	3/4"	3 1/4"	1 1/2"	poplar	1
D	3/4"	3 1/4"	1 1/2"	rosewood	1
E	3/4"	3 1/4"	1 1/2"	poplar	1
F	3/4"	3 1/4"	1 1/2"	padauk	1

Supplies: epoxy glue, brooch pins, lacquer



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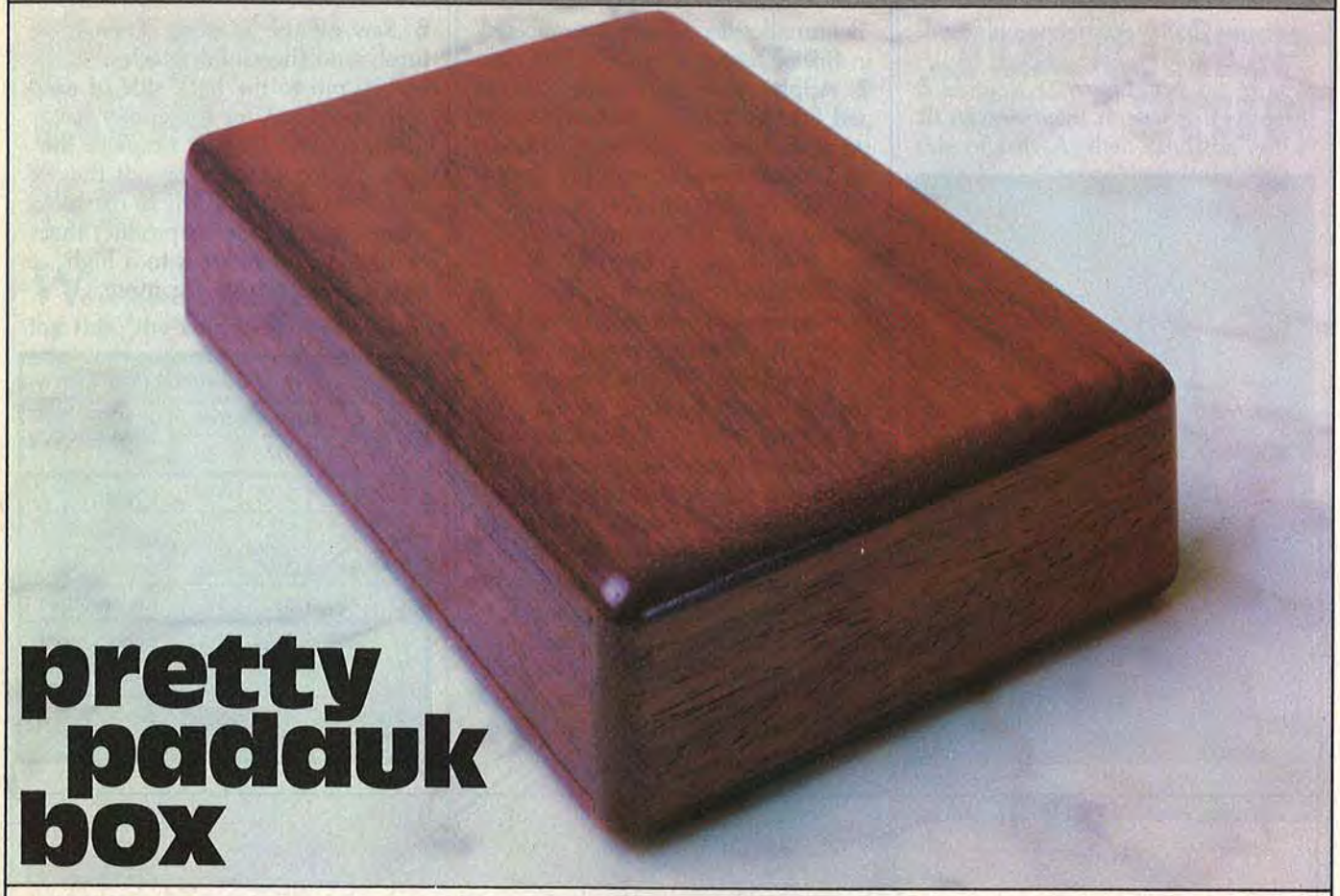


pretty padauk box

Simple, yet elegant, this nicely tailored project will serve admirably either as a dainty jewelry box or, if you install a divider, as a two-deck card box. In a word, it's got class!

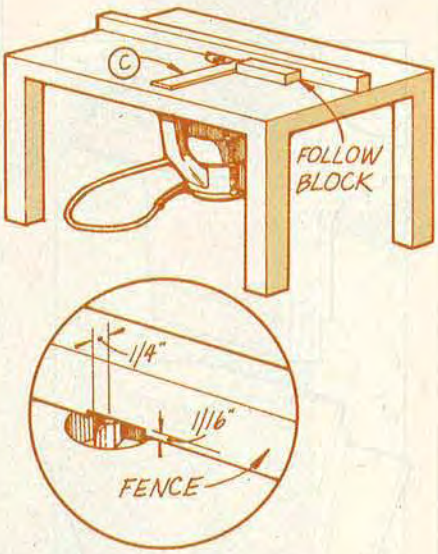
Note: You'll need ⅛" and ¼" material for this project. We ordered ours from Constantine's. If you have some thicker stock on hand, you can resaw it or plane it to its proper thickness.

Making the Case

1 Rip and crosscut parts A, B, and C to size. Since you're dealing with thin stock, you may find the going easier if you use a band saw. If you use a table saw, use a zero-clearance wooden table insert to prevent small pieces from falling into the blade.

2 Rabbets are the only joints used on this project. Due to the small dimensions of the pieces, we recommend that you use a router secured to a router table to make the rabbets. We used a ⅜" straight bit. The height of the bit controls the depth of the rabbet; use a fence to adjust for width.

Start by cutting a ¼" rabbet 1/16" deep into one end of both of the sides (C) (see the drawing below).



With the same setting, cut rabbets into the sides and the back edge of the top and bottom of the box (A).

3 Using a ¾" hole saw (with pilot drill bit removed) chucked into a

drill press, drill a hole through the center of part B. Set aside the cutout; you'll glue it to the drawer back later.

4 Dry-clamp parts A, B, and C together to check for a good fit. Glue and clamp the case and set aside to dry.

5 Using a ¼" round-over bit on a router table with a fence, round-over all of the edges on the case.

Building the Drawer

1 Cut parts D, E, and F to size. Then, cut a ⅛" rabbet ⅛" deep in the bottom edge of the front/back (D) and the sides (E) to accept the bottom (F).

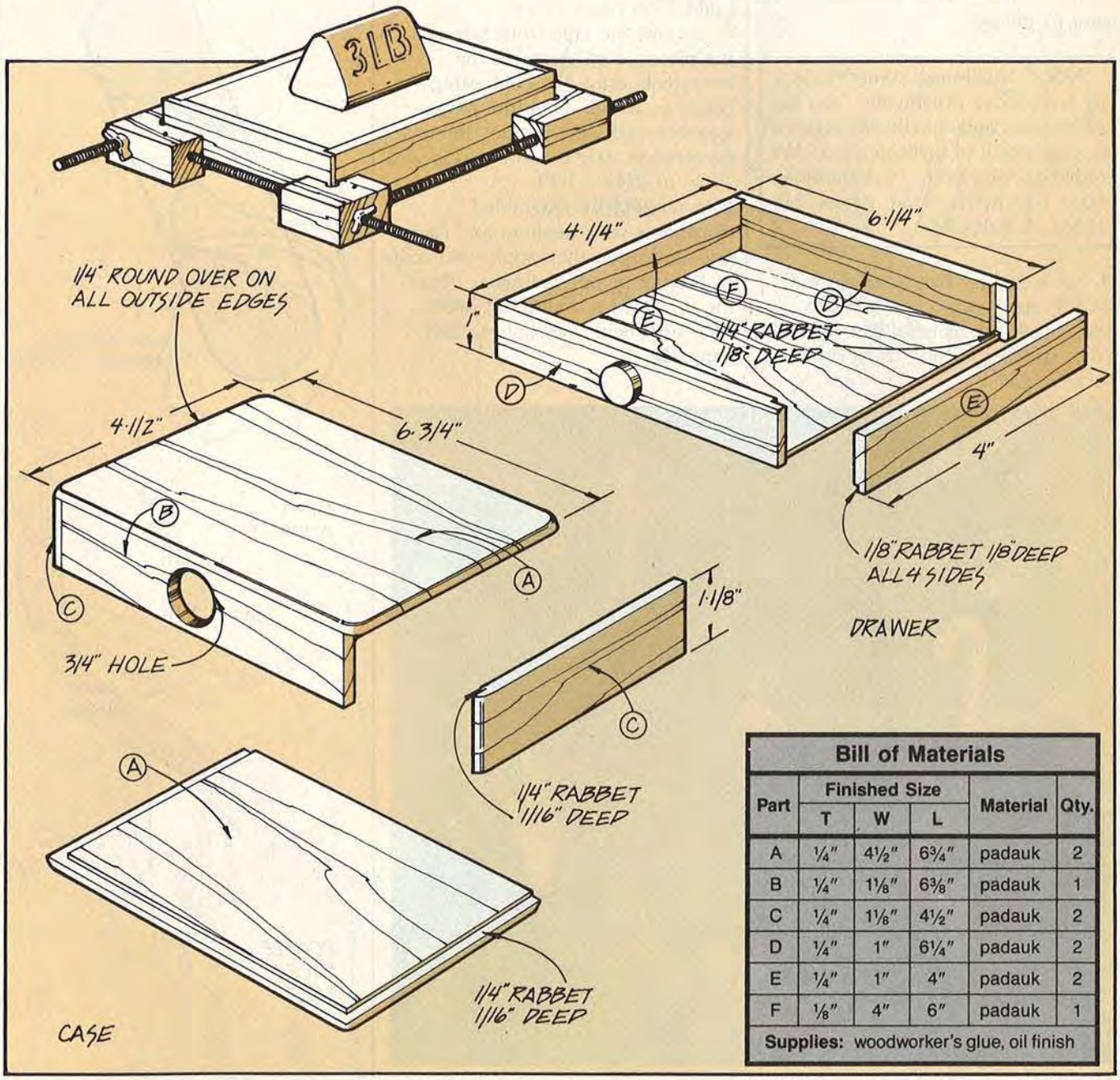
2 Cut a ¼" rabbet ⅛" deep into each end of the front and back (D).

3 Dry-clamp the drawer parts together as before to check for a good fit, then glue and clamp as shown in the sketch below. If you do not have a clamp like the one shown, steel bar clamps (sliding head type) or a web clamp will work equally well.

Finishing Touches

1 Fit the drawer into the case (sand if necessary for a good fit). Mark the location of the drawer button, then remove the drawer and glue and clamp the button into position. (Be sure the grain of the button matches that of the back of the case.)

2 Sand all surfaces of both the case and drawer smooth, then apply two or more coats of oil finish, inside and out. ■



Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	¼"	4½"	6¾"	padauk	2
B	¼"	1⅛"	6⅜"	padauk	1
C	¼"	1⅛"	4½"	padauk	2
D	¼"	1"	6¼"	padauk	2
E	¼"	1"	4"	padauk	2
F	⅛"	4"	6"	padauk	1

Supplies: woodworker's glue, oil finish

Continued

christmas tree ornaments

Add an extra-special touch to your Christmas tree (or someone else's) this year with these fun-to-make wooden ornaments. Trace any or all of our six full-size patterns or design your own. Either way, these delightful tree trimmers are sure to please.

Note: You'll need some ⅛" stock to make these ornaments. You can either resaw and sand thicker material or purchase it in that thickness. We ordered ours from: Constantines, 2050 Eastchester Road, Bronx, NY 10461. Catalog $1.

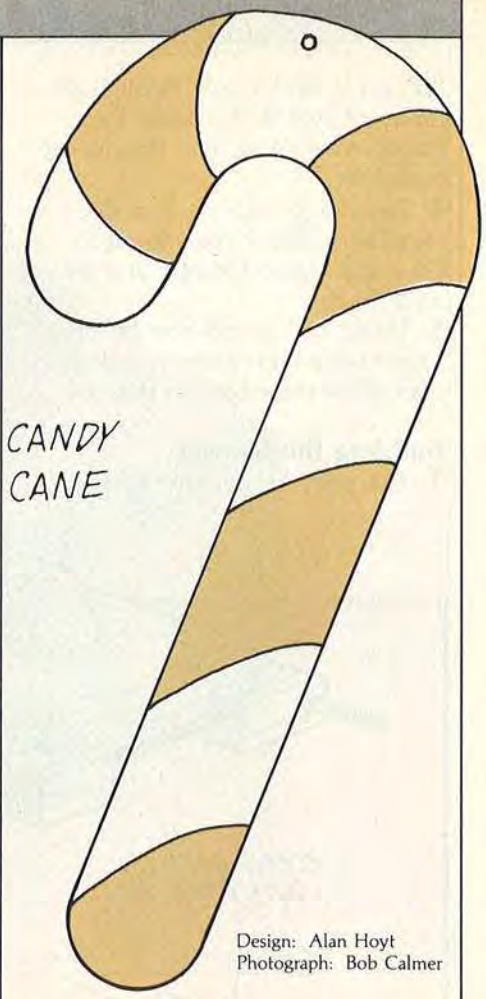
1 Cut a slightly oversized piece of each type of wood you want to use. Stack the material (the lightest-color species on top), using double-face tape to adhere the pieces together.

2 Transfer the design to tracing paper, then use carbon paper to transfer it to the stock.

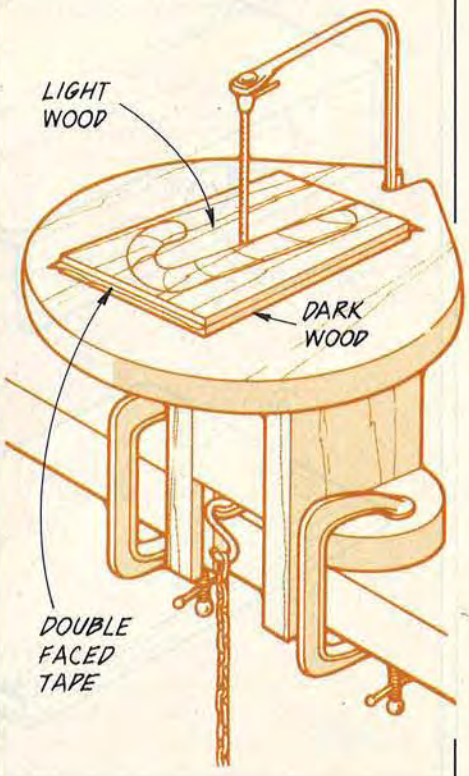
3 Cut through the stacked material with a thin-bladed coping saw, jigsaw, or our "Foot-Powered Coping Saw" (we show you how to build it on pages 70-71).

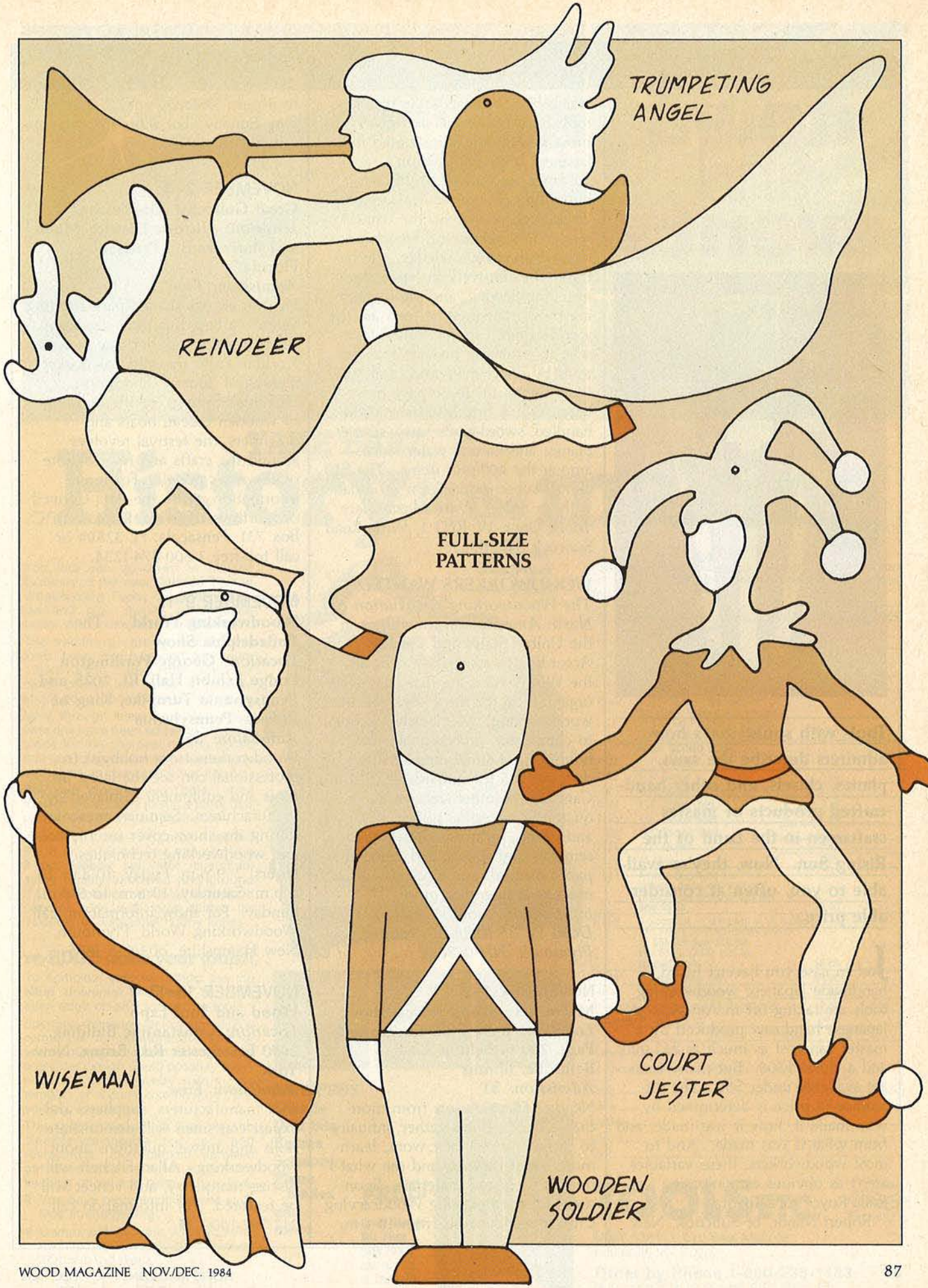
4 Remove the tape from between the pieces, then assemble the ornaments using the contrasting colors of wood. Glue the pieces together with epoxy glue. Remove excess glue after it forms a skin and allow to dry.

5 Hand-sand the assembled ornaments with medium and fine grit sandpaper, then apply two coats of lacquer or polyurethane. After the finish dries, drill a 1/16" hole in each ornament; insert string and hang. ■



Design: Alan Hoyt
Photograph: Bob Calmer




TRUMPETING ANGEL
REINDEER
FULL-SIZE PATTERNS
WISEMAN
COURT JESTER
WOODEN SOLDIER

news and events

Tools with souls, that's how admirers describe the saws, planes, chisels, and other hand-crafted products of master craftsmen in the Land of the Rising Sun. Now, they're available to you, often at considerable price.

Just in case you haven't heard, handmade Japanese woodworking tools are taking off in America. A Japanese hand saw produced by a master can cost as much as $12,000 and a chisel $500. But many tools are available under $50. The difference in price is determined by who made it, how it was made, and from what it was made. And to most woodworkers, these variables aren't as obvious as comparing a Rolls Royce to a Toyota.

Robert Major, of Suncook, New Hampshire, believes these historic tools have real "soul" and gives those woodworkers interested in Japanese tools information, guidance, and advice in his bimonthly newsletter *Masterpiece Tools*. Major reviews the works of master toolmakers and woodworkers from firsthand knowledge. He has traveled extensively in Japan studying, interviewing, and photographing those craftsmen he feels are the world's finest. In addition, Major sells an extensive line of Japanese tools by direct mail, and catalogs them in the 14- to 36-page newsletter. You'll find listed sharkskin-handled, sword-grade saws, scraper planes, and natural water stones among the 400-plus items. The $10 annual subscription fee is refundable with an order. Write *Masterpiece Tools*, Dept. W, RFD 1, Wing Road, Suncock, NH 03275.

WOODWORKERS WANTED

The Woodworking Association of North America seeks members in the United States and Canada. According to association officials, the W.A.N.A. is the first large-scale organization for those involved in woodworking. Membership is open to companies, professionals, and hobbyists. Annual membership dues are $15 for individuals ($18 in Canada). Members receive a quarterly magazine, notice of shows and events, reduced admission to seminars and shows, and reduced prices on tools and materials as are made available. *For more information, write W.A.N.A., Dept. W, 35 Main St., Suite 6, Plymouth, NH 03264.*

NOVEMBER 1–2

Midwestern Woodcarving Show
***Location:* Belle Clair Fairgrounds Park, 200 S. Beltline East, Belleville, Illinois**
***Admission:* $1**
Nearly 150 exhibitors from more than a dozen states gather annually to show and sell their work, learn more about carving, and see what's new in tools and materials. Sponsored by the Belleville Woodcarving Club, the show runs from 10 a.m. to 8 p.m. Saturday and 10 a.m. to 5 p.m. Sunday. For more information, call 618/233-5970.

NOVEMBER 2–4

Great Gulfcoast Arts Festival
***Location:* Historic District, Main and Barracks St., Pensacola, Florida**
***Admission:* Free**
Held in an oak-shaded park fronting Pensacola Bay, this three-day festival celebrates the folk heritage of west Florida. From the split oak basket-making of Tommy Thompson, DuFuniak Springs, to the building of wooden bateau boats and dulcimers, the festival revolves around the crafts and rich folklore of the area's people. For more information, write the Arts Council of Northwest Florida, Dept. W, P.O. Box 731, Pensacola, FL 32594 or call toll-free 1-800-874-1234.

NOVEMBER 9–11

Woodworking World — The Philadelphia Show
***Location:* George Washington Lodge Exhibit Hall, Rt. 202S and Pennsylvania Turnpike, King of Prussia, Pennsylvania**
***Admission:* $5**
Woodworkers from hobbyist to professional can see the latest in tools and equipment displayed by manufacturers. Seminars presented during the show cover use of tools and woodworking techniques. Hours, 2–9 p.m. Friday, 10 a.m. to 6 p.m. Saturday, 10 a.m. to 5 p.m. Sunday. For show information, call Woodworking World, Plymouth, New Hampshire, 603/536-3876.

NOVEMBER 16–17

Wood and Tool Expo
***Location:* Constantine Building, 2050 Eastchester Rd., Bronx, New York**
***Admission:* Free**
Tool manufacturers, suppliers, and expert craftsmen will demonstrate skills and answer questions about woodworking. Allan Fitchett will discuss marquetry, and veneer will be featured. For information call 212/792-1600. ■

Print this article

TAKE PART...
History in the making

You, too can go down in history. Experience the **new Carbide Tipped Woodturning Tools;** outstanding tool life and high quality performance under demanding work conditions!!

The traditional carbon steel turning tools have been around for years ...then along came HSS (which is more costly) but holds a useable sharp edge longer than plain carbon.

Now, through latest technology, carbide tips have been added to the steel blade for the sharpest cutting edges that last longer between sharpenings and gives an even smoother finish.

Buy your Woodturning Tools...in kit form or individually to suit a particular project or add to your collection...

In addition to the 4 pc. carbide set and the 8 pc. HSS set you can add the **8 pc. Hobby set**...(not illustrated) same quality tempered and ground 3½" HSS blades, with 5½" hardwood handles. Use with large lathes for detailing or with small hobby lathes.

re-EDGE-ucate your tools!!

To complete **your** workshop use the **NEW Universal Sharpener** to put a keen edge on all your turning tools.

Specially designed for low speed (200 rpm), low temperature dressing of your tool edges without having to use a grinder (which could possibly overheat the tool thereby ruining its temper), or a cumbersome time consuming whetstone.

This sharpening system uses six inch diameter **removable** disc pads and replaceable, cloth-backed abrasive grit discs assuring a flat surface for keeping chisel and plane edges true.

- You have more flexibility and save time in sharpening.
- Comes with two disc pads and one each No. 150 and 240 cloth-backed abrasive grit discs.

All items are U.S.A. manufactured

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SHARPENS
Chisels
Drill bits
Knives
Scissors
Plane blades
and more

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Chisel Storage Box Plans. Send name, address, zip, to Tools, Etc.

ORDER TODAY! No risk, money back guarantee. If you're not satisfied, just return in original carton for immediate credit or refund . . we pay the shipping cost . . . both ways!

Item No.	Description	Qty.	Price	Extension
	Carbide Tipped			
17541	1" Skew Chisel		$17.95	$
17542	1/2" Round Nose		17.95	
17543	3/4" Gouge		17.95	
17544	Right Skew; face plate		17.95	
17545	4 PC. SET — One each of the above (Individually priced @ $71.80) Plus FREE Silicone Carbide Stone **Save $10.00**		61.80	
	High Speed Steel			
17521	1/4" Gouge		7.45	
17522	1/2" Gouge		7.95	
17523*	3/4" Gouge		9.75	
17524	1/2" Spear Point		7.75	
17525*	1/2" Round Nose		7.45	
17526*	1/8" Parting Tool		7.45	
17527	1/2" Skew		7.45	
17528*	1" Skew		9.75	
17853	4 piece Beginning Set — includes items indicated by * (Individually priced @ $34.40) **Save $5.00**		29.40	
17859	8 piece Set — one each of all 8 Chisels No. 17521-28 (Individually priced @ $65.00) **Save $10.00,** plus FREE Detail tool for delicate work		55.00	
17984	8 piece Hobby Set		36.00	
14630	Universal Sharpener		59.95	
Shipping & Handling, add $3.50 per order			3.50	3.50
KY residents, add 5% tax			—	
	TOTAL (U.S. Dollars)			$

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USEFUL TOOLS AT SPECIAL PRICES!

MARPLES CHISEL SET

These famous English made chisels are bevel edged with straight grained ash handles. Hardened and tempered Sheffield forged steel sharpened and honed to a perfect cutting edge. Heavy steel ferrules permanently mate the blades to the handles. Ideal for light mallet work as well as hand chiseling. Set comes complete with a protective soft vinyl case which hangs up for convenience. Blade guards are included with the set. 4 pc. set: ¼", ½", ¾", 1".

4 Pc. Chisel Set **$18.95** ppd

FORSTNER BIT SETS

We've sold thousands of these bits. Woodworkers have been delighted with their ability to cleanly drill flat bottomed holes, part of a circle or very thin materials. These bits leave a smooth edge even when drilling end grain — perfect for doweling. And now we've added another great feature. A sturdy metal case with a cushioned interior to protect the cutting surfaces. Best of all, we include the case at no extra charge! 7 pc. set consists of 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1" with a metal case. A 15 pc. set (without a case) includes the above plus1-1/8", 1-1/4", 1-3/8", 1-1/2", 1-5/8", 1-3/4", 1-7/8" and 2".

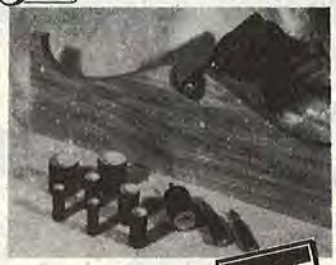
7 Pc. Set with Case **$49.95** ppd

15 pc. set **$169.95** ppd

DELUXE SQUARE RECESS WOODSCREW KIT

These screws shouldn't be confused with cheap hardware store screws — the soft kind with the shiny plating. All of our screws are hardened and tempered with a black oxidized finish to retard rusting. Widely used in furniture and cabinet making, the square recess helps prevent slippage (and damage) and lets you sock screws down tight. Thin shank eliminates the need for oversized pre-boring. Set consists of 600 #8 screws (100 each 1", 1¼", 1½", 2", 2½", 3"), hand screwdriver, power drill bit and a 6 bin unit which can be wall mounted or stacked on a bench.

Square Recess Kit **$19.95** ppd
(Also available in Phillips for $17.95)



DRUM SANDER SET

Use your drill or flexible shaft tool to sand contours and holes, grind and polish tools and perform many difficult finishing jobs. Sanding bands easily mount to our expandable drums without adhesive. Standard 15 pc. set contains 5 drums, 1 fine and 1 coarse band in sizes ½" x ½", ¾" x 1", 1" x 1", 1½" x 1½", 2" x 1½". Wide (2") band 12 pc. set contains 4 drums, 1 fine and 1 coarse band in sizes ½" x 2", ¾" x 2", 1" x 2', 1½" x 2". Refills available.

Standard Set **$10.95** ppd

Wide Set **10.95** ppd

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800-343-3248 Nationwide **800-322-6100** Mass.

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Continued from page 76

old hand ways

When the pieces are as thin as you want them to be, they will often need additional trimming with a hatchet to remove the decay-prone white sapwood under the bark. They may also need a bit of shaving with a drawknife to ensure that they will lie flat and tight on the roof or walls. The finished boards then go into great tall stacks to dry and flatten a bit before they go on the house. The rejects go into the fire, inspiring the expression, "The good ones keep you dry, the bad ones keep you warm."

You can make all the parts of a house by hewing and splitting, but putting them together is the job of a carpenter, the next of The Old Hand Ways. ■

The froe gives you the strength of ten for the final splitting. The forked limb gives you the leverage to keep the split running true.

TALKING BACK

LETTERS

We welcome comments, criticisms, suggestions . . . even an occasional compliment from readers. The volume of mail we receive makes it impossible to answer every letter, but we intend to publish excerpts from our correspondence in each issue of the magazine. Send letters to:

Letters Editor
Better Homes and Gardens®
WOOD Magazine
Locust at 17th
Des Moines, Iowa 50336

I have always had trouble trying to determine what type and color of stain to use. It is very hard to match [an] original finish or to match various pieces of furniture. Also, many pieces of furniture have different types of wood in the same piece which stain differently. It would probably take a series of articles (and a lot of guts) to cover the myriad stains and application techniques, but you would be doing us a great service.

—Robert M. Girard, San Antonio, Texas

"Finishing and Refinishing" will become a regular feature starting with the next issue of WOOD.

I am a professional woodworker and lecturer. Your slick promotional insert left much to be desired. The fellow sanding high up on a bench is an example. How about a mask? He shouldn't have long sleeves and a ring. I realize that this is a set-up studio shot. But details are important.

—Bill Stankus
Bayside, Wisconsin

The photograph Mr. Stankus refers to was also the cover shot for our first issue. Since we are intensely concerned with shop safety (and because the fellow in the photo is WOOD Editor Larry Clayton, the only person around here who knows where everything is) we thought we'd better review our safety procedures.

We telephoned the Power Tool Institute and learned that the group recommends a "comfortable" work height for power tools.

Institute spokesperson Jim Bates agreed that woodworkers should remove all rings and other jewelry before using power tools. He said that a dust mask is an absolute necessity when a sander is used for extended periods but isn't required when sanding is done for short time spans where negligible dust is produced. He also reminded us that our model should have worn safety glasses equipped with side shields. Bates did not feel that long sleeves posed a safety hazard here.

We agree with Mr. Stankus that, particularly where safety is involved, details **are** *important.* ■

Print this article

- Two speeds provide power to do it all: drilling, impact drilling, tapping and driving and removing screws.
- 9.6 volt battery can be recharged in one hour, yet cannot be overcharged.

For more information consult the Yellow Pages under Tools (electric) for your local Porter-Cable Professional Tool Distributor or write for a free, full line product and accessory catalog.

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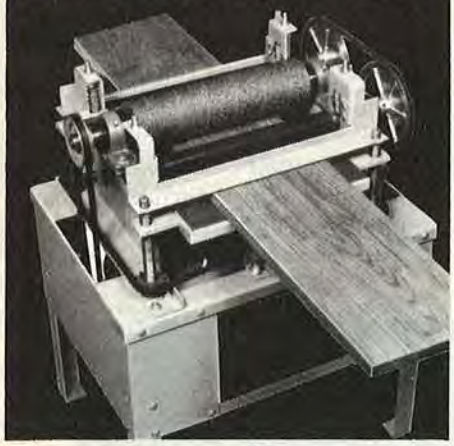
NEW Power-Feed DRUM SANDER!



At last! A complete power-feed Drum Sander at an affordable price! Comes ready to use including hood, stand and motor!

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You can use this high tolerance machine for light dimensioning as well as the finest finish work. Because stock is power-fed at a uniform rate, you'll achieve results impossible to duplicate with hand methods or hand-held sanders. Dimensions remain exact — no more low spots, waves or cross grain marks!

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Use the Woodmaster to dimension and finish-sand cabinet pieces, resawn stock, paneling, grandfather clocks, toys, tabletops, knees, burls, crotches, and much, much more! You'll soon find it's one of the most valuable tools in your shop!

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Send for complete facts on how you can try the Woodmaster Power-Feed Drum Sander in your own shop for 30 days completely without risk! We'll also send you complete details on how you are fully protected by Woodmaster's One Full Year Limited Warranty. Easy Terms.

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FURNITURE PROJECT

Continued from page 72

hexagonal stereo speakers

the speakers to the crossover according to the instructions supplied with the crossover.

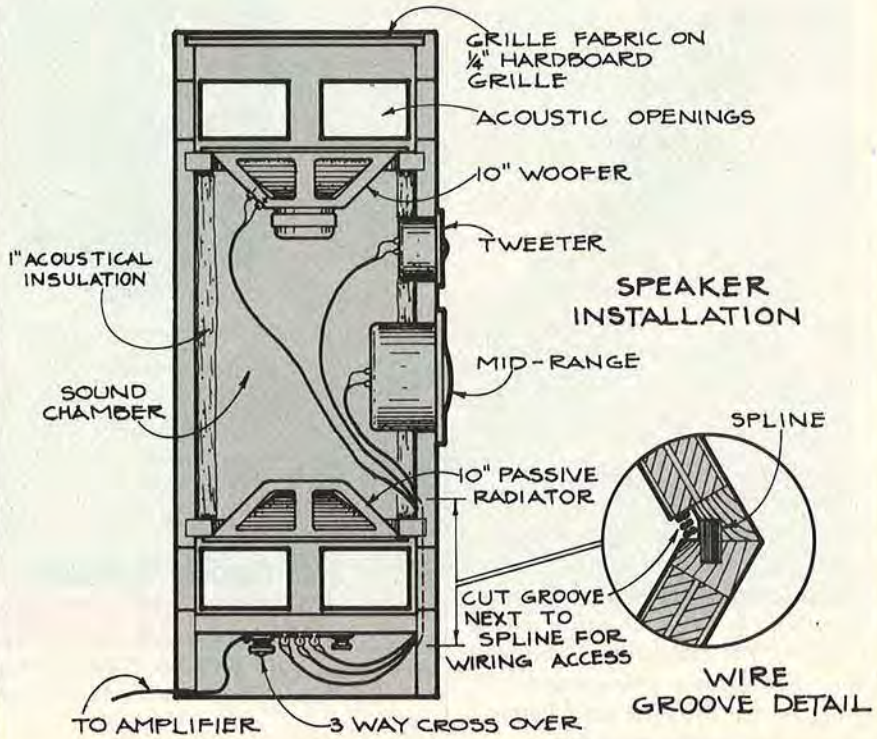
6 Install acoustical insulation along the inside of the enclosures, and cut holes in the insulation to fit around the side-mounted speakers. We friction-fit our insulation, although you can use staples.

7 Mount the speakers and run the wire as shown in the speaker installation drawing shown below. Seal the sound chamber as tightly as possible around the wire groove and mounting boards (we used preformed bead caulking for a near airtight seal in the sound chamber).

DESIGN NOTES: This high-performance speaker design utilizes a 10" air-suspension woofer that is connected via air pressure in the sound chamber to a nonelectrically operated passive radiator. When the woofer speaker cone moves, the cone in the passive radiator moves in sympathy with it. This accomplishes two things. First, it effectively doubles the speaker area and, second, it allows the woofer to move freely due to the absence of pressure buildup in the sound chamber, thereby increasing bass response.

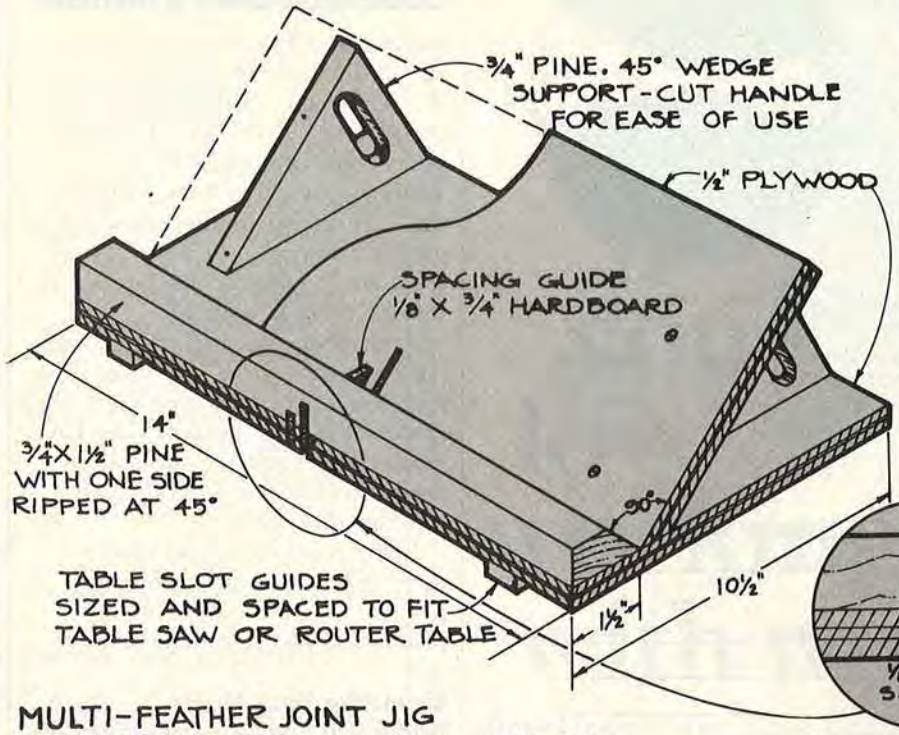
Be sure to use sealed tweeter and midrange speakers so they won't be affected by the sound chamber pressures.

We connected all three speakers to the amplifier through a three-way crossover. The crossover, actually a filter device, allows only low frequencies to travel to the woofer, midrange frequencies to the midrange, and high frequencies to the tweeter. ■



SHOP-TESTED TECHNIQUES

Continued from page 51


¾" PINE. 45° WEDGE SUPPORT - CUT HANDLE FOR EASE OF USE
½" PLYWOOD
SPACING GUIDE ⅛" X ¾" HARDBOARD
14"
¾"X1½" PINE WITH ONE SIDE RIPPED AT 45°
90°
TABLE SLOT GUIDES SIZED AND SPACED TO FIT TABLE SAW OR ROUTER TABLE
10½"
1½"

MULTI-FEATHER JOINT JIG
WITH DETAIL FOR DOVETAIL KEY JIG

HOW TO USE THE JIG

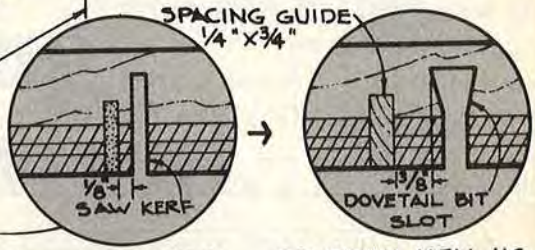
1 Adjust the saw blade to proper height (approximately 1" above saw table for ¾" stock).

2 Place the jig on saw table and pass it across stopped saw blade to check alignment.

3 Place stock against spacing guide and make first cut. Test with scrap first.

4 Lift the stock and reposition, with the first cut over the spacing guide.

5 Repeat step 4 for additional cuts.



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- 500-3100 S P M

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WITH DUST COLLECTOR
#1288 934
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WITHOUT DUST COLLECTOR
#1288 034 (same features)

- Powerful and efficient dust-removal system prevents sandpaper clogging ensures smoother finish and longer sandpaper life
- Counter-balanced, vibration free
- The compact design allows close quarter work
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1-3/4 H.P. ROUTER, #1604
- Captive templet
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- Two wrenches

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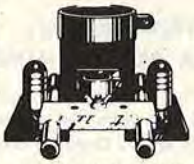
Dremel's best, features a dependable 5,000-28,000 RPM motor and 40 useful accessories for grinding, cutting, sanding, polishing and more. Deluxe storage case included.



FREE ROUTER
Right now, when you buy a specially marked 3801 Moto-Tool Kit, you also get a free Dremel router attachment and router bit. With it, you can shape sharp edges, carve recesses and cut a variety of grooves and channels.

save $93.25

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Moto-Tool #380	$85.95
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- Lightweight handpiece

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DELUXE SCROLL SAW SANDER WITH 34 ACCESSORIES
- 15" cutting throat

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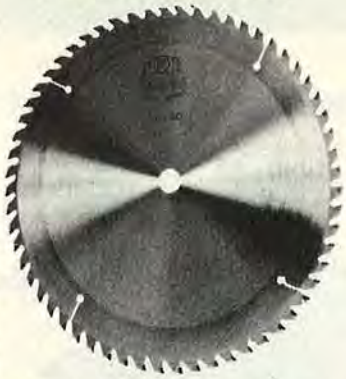

Thin Rim 10" Carbide Blades
Saves wood and only takes half the power.

Thin rim blades are taking professional shops by storm. When you first use one you will wonder, "Of course, why didn't someone make this sooner?" Well, the answer is it takes modern metallurgy and manufacturing techniques to make this product work.

Work it does—the thin kerf really saves wood and makes delightfully dainty cuts. It has an alloy steel body 1/16" thick and cut a 3/32" kerf. Because of the thin design much less power is needed and the finish of the cut is magnificent approaching hollow ground planer blades. We now use the 100 tooth model almost exclusively in our own shop.

10" diameter x 40 tooth Carbide Combination Blade, 3/32" Kerf	~~43.50~~	$34.95 ppd
10" diameter x 60 tooth Carbide Combination Blade, 3/32" Kerf	~~49.95~~	$39.95 ppd
10" diameter x 100 tooth Carbide Combination Blade, 3/32" Kerf	~~74.95~~	$59.95 ppd

Dear Conover:

Please send me: _____40T blades @ 34.95 _____60T blades @ 39.95

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Shophelper™

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U.S. PAT. #3-738-403

Anti-Kickback Stock Feeder

SAVE TIME! SAVE MATERIAL!
LIKE HAVING AN EXTRA PAIR OF HANDS!

***Keep your fingers** away from cutters. Let Safety Guides hold your work. Use your hands to feed and control the operation. Push stock through Safety Guides with a follow board.*

WORK WITH CONTROL!
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BUYMANSHIP BASICS

Continued from page 67

cabinet-quality lumber

the National Hardwood Lumber Association, see the chart on page 67. This same chart also discusses the grading system for white pine, which was formulated by the Western Wood Products Association. In cabinet lumber there are great differences in quality, just as there are in construction lumber, so use the chart as a guide.

Remember, too, that in building a large project such as a table or desk top, you'll generally need the higher grades of lumber because they have fewer defects and are available in greater widths and lengths than lower-grade boards.

Many retail hardwood dealers carry only the highest grades possible to avoid customer complaints and discount requests.

Estimating Your Needs

Before you purchase any lumber for a project, draw a cutting diagram, and figure the board footage needed. And, if at all possible, buy from a dealer who will allow you to hand-select your boards. Hand-selecting gives you two distinct advantages. First, you can choose the grain, color, and texture you'd like to have. Second, you'll be able to select your lumber in sizes that accommodate your cutting list and thus reduce waste. If you cannot choose your own lumber, allow about 20 percent for waste and add it to your needed board footage.

Where to Buy Cabinet-Quality Lumber

In addition to the cabinet-quality lumber available from lumberyards, home centers, and retail specialty stores, you have the option of mail-order buying.

The number of firms offering quality hardwood by mail has mushroomed and you're likely to find one close to your area of the country. Most firms offer a variety of dimensions and species as well as veneers and turning blocks. Though you'll be able to order pieces down to ¼" in thickness, lengths will

normally be limited to about 6 feet, since shipping traditionally is done via UPS or parcel post. You can make alternate shipping arrangements for oversize and larger amounts, but you'll have to discuss your purchase on the telephone. Discounts on large orders often apply. Some companies include shipping in their catalog prices; others charge separately.

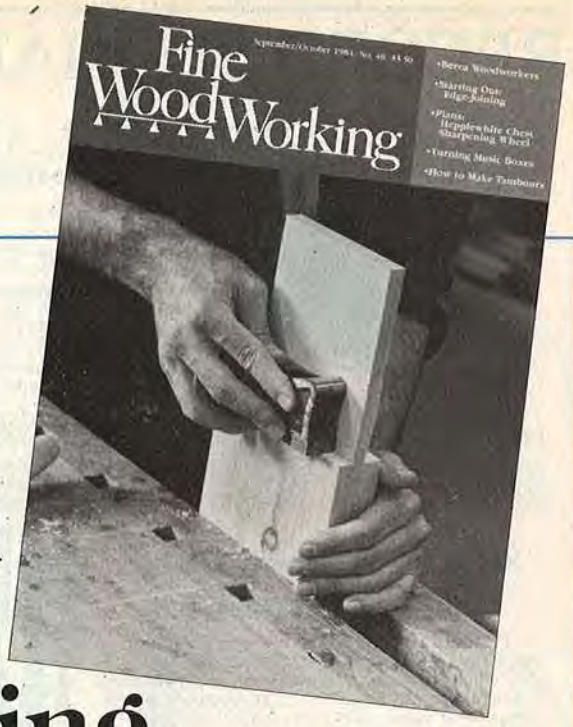
Mail-order lumber definitely addresses a need for those woodworkers who don't have a supplier nearby. And the quality will be the highest possible for each specie offered.

If you have any questions or are uncertain of your needs before you order, call the company. That way you'll receive exactly what you require.

Note: When ordering by mail from an area of different climate, such as Pennsylvania when your home is in Arizona, keep this in mind: differences in temperature and humidity cause changes in the wood and so can adversely affect the outcome of a project if you use it right away. So be sure to allow the wood to acclimate in a dry spot in your shop for at least two weeks before working.

One other lumber-purchasing option deserves mention because it sounds attractive to lots of people. And that alternative is green wood. In rural areas you can normally go directly to the logger and purchase a felled and de-limbed log, then hew it yourself, or take it to a mill. Or you can go directly to an area sawyer for the log and for any custom-cutting you desire. In metropolitan areas, you often can find green wood for free from tree-trimming services, water works and parks departments, and county and state highway departments.

Our advice on purchasing green wood is brief and to the point: Unless you have prior experience with green wood and know how to bring its moisture content down, stick with kiln-dried material. ■



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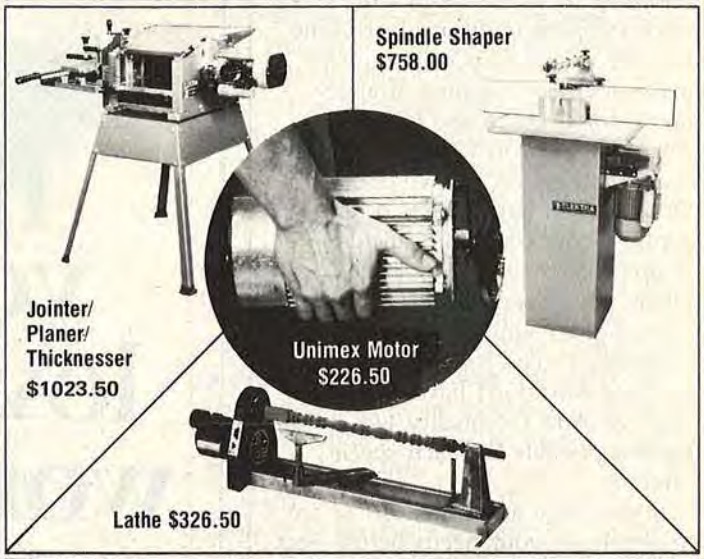

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SOUND ADVICE

Print this article

wood look alikes

Your local hardwood dealer is temporarily out of black walnut and you want to build that headboard this weekend. Why not substitute?

Some woods are very close in color and grain, and can be used to imitate each other. Often the right finish is all that's needed to complete the switch successfully. No one should substitute for deceptive reasons, of course, but there are times when availability and economy can be valid determining factors for replacing one wood with another.

Remember, though, that wood is like fingerprints—no single species is exactly like another in all respects. Red oak can imitate white oak in furniture, for instance, but you wouldn't build a boat with it because it's not watertight. Before you embark on a substitute wood project, check with a knowledgeable hardwood salesperson to see whether or not the intended use is advisable.

The chart shown lists some examples of wood look-alikes that are commonly available at retail hardwood stores or through mail-order outlets. But if you want to substitute an exotic such as oolemeriballi for mutsekamambole, even the world's largest exotic wood importer may be unable to fill the order, and will probably send you back to your drawing board. ■

Commonly available look alikes

Traditional Wood	Substitute
Cherry	Alder
Pecan	Hickory
Teak	Iroko
Maple	Birch, Beech
Aspen	Basswood
Walnut	Butternut, willow, red gum
Red Oak	White Oak, Ash, Chestnut, Elm
Honduras Mahogany	Phillipine & African Mahogany
Brazilian Rosewood	Indian Rosewood, Cocobolo, Pau Ferro, Morado

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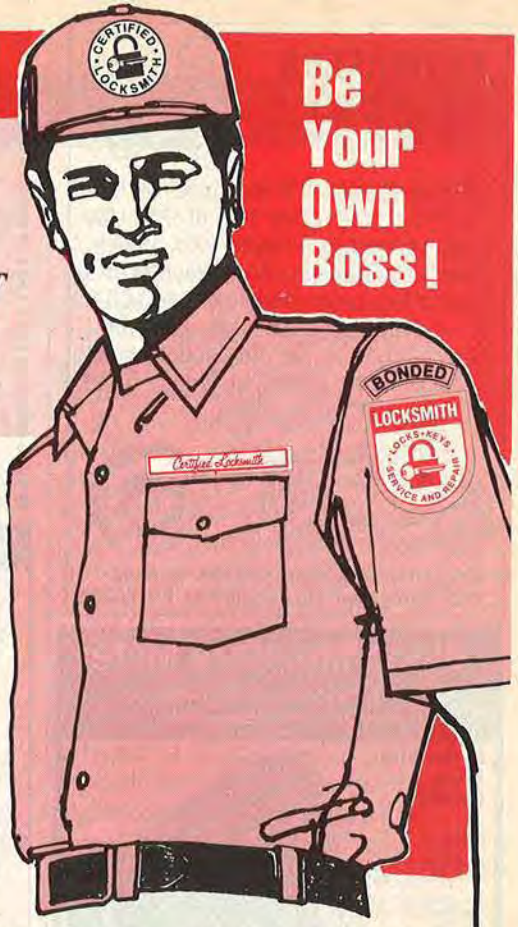

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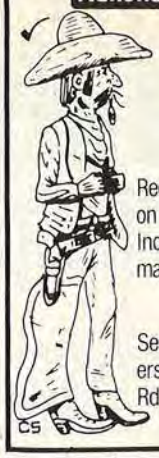

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Pernambuco — the wood that named Brazil

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The earliest documentation of dye being extracted from wood was by Marco Polo in 1299 when he discusses the methods used by the Asian people. It is widely thought that the wood he was discussing is sapan, an important article of commerce during the Middle Ages.

Pernambuco's history goes back to the Portuguese discovery of it in South America in 1500. On a voyage back to Portugal, a cargo of pernambuco logs became wet and dyed the interior of the ship red. When the ship reached port, the reaction of the Portuguese citizens was so overwhelming that the Crown took notice and by the year 1623 the Portuguese had put a royal monopoly on pernambuco, restricting its extraction and exportation. Other countries could only acquire pernambuco by permission of the Portuguese Crown. This monopoly held until 1910, when an abundance of logs and the introduction of artificial means of manufacturing dyes caused the bottom to fall out of the dyewood market.

So how did pernambuco name Brazil? The Portuguese called it dyewood, but in their language dye is pronounced *brazil*. Since this wood was exploited from a region in South America, that region was named Brazil. Its trade name is pernambuco because it originates in the State of Pernambuco in Brazil.

Several other species that yield red- or orange-colored dye are referred to as brazilwood, too, but with these there's no geographical significance. And whatever happened to pernambuco? Today, this wood is used almost exclusively to manufacture the finest violin bows.

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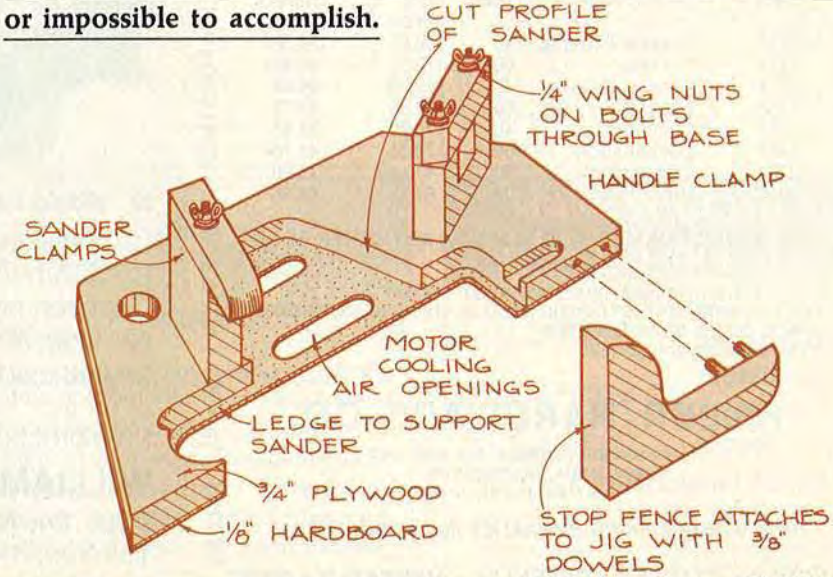
Print this article

How do you sand true edges on plywood or other stock with a hard-to-hold portable belt sander? Normally, you can't. But with this jig, you can now turn your sander into a precision stationary unit. You'll be able to do lots of things that formerly were difficult or impossible to accomplish.



Continued

JIGS AND FIXTURES

Made of plywood, hardboard, and scrap hardwood, and custom-cut to fit your portable belt sander model, the jig illustrated clamps to a shop vise to allow for square edge sanding. Or, use it on its back for square sanding of short stock.

Start with a piece of ¾" plywood large enough to fit your sander, allowing space for clamping at the bottom and the sides. Lay your sander on its side on the plywood and trace its profile, then cut along the line drawn.

Next, place the cutout plywood on a piece of ¼" hardboard the same size and mark the cutout outline. Be sure to leave a ledge as shown in the drawing to support one side of the sander. After cutting the hardboard to fit, glue it to the plywood and allow the assembly to dry.

Lay the sander on the jig so that you can measure the sizes of the two clamping blocks — one for the body and one for the handle. Cut and assemble the hardwood clamps as shown in the exploded-view drawing using ¼" wing nuts on bolts inserted through the base. To aid in sanding short pieces of material, make the stop fence depicted in the drawing. It attaches to the jig with ⅜" dowels.

Using the Jig

For square-edge sanding of plywood or edge-joined pieces, clamp the jig and sander to your workbench top as shown in the photo on the opposite page. Make sure that you don't restrict the motor cooling cutouts, and that you don't turn down the sander clamps so tight they'll distort the hardboard backing. When sanding edges, lay a piece of hardboard or other material under the stock in order to raise it slightly above the bottom edge of the sanding belt.

Short pieces become easier to sand, too, when you clamp the jig so the belt sander rides in its upside-down position (see photo inset). The stop fence keeps the material that's being sanded from running off the belt. ■

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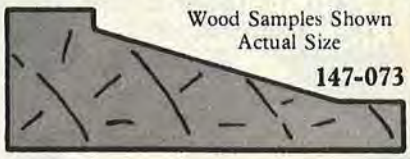
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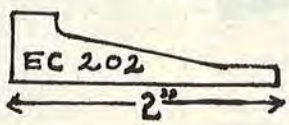

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IDEA portfolio

1

With the holidays around the corner and gifts to make, you need all the ideas you can find. To help spark your creative spirit, we've included several we like a lot. Use them as they are or modify and upgrade them to fit your needs. For some, you can order plans to direct your efforts.

2

3

1. CLASSIC PEMBROKE TABLE

Traditional in style, this occasional table will rate a commanding spot in your home. With drop leaves, tapered legs, a drawer, and inlaid trim, it's sophisticated yet functional. The table shown was built of cherry, but you can select any wood you prefer.

To order plan number 50491, send your name and address, the plan number, plus a check or money order for $5.95 ($4.95 for the plan, plus $1.00 for postage and handling) to: WOOD Reader Service, 1716 Locust Street, Dept. 3MA, Box 374, Des Moines, IA 50336.

2. LEGAL-LOOK STEREO CABINET

A glass-doored cabinet with professional bearing is all you'll need to protect valuable audio equipment from dust and moisture. There's even room below for album or cassette storage. Wires to speakers run from behind through pre-drilled holes. This cabinet measures 16" deep×23" wide×51" high.

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3. TABLETOP WINE GLASS RACK

Trimmed in walnut, this dandy solid red oak rack serves a dual purpose —stylishly storing glassware while adding a bold dash of sculpture to a table setting.

This unit measures 6" wide×21½" long×7¼" high. We used ¾" material for the base and ½" for the top, with ½" oak dowels joining the two. Spacing of the notches for the glass bases, as well as their depth and width, depends on the glasses you intend to use, so plan your cuts accordingly. Note that the top of each notch is chamfered to better accept the glass bases. Finish the piece with water-resistant varnish.

4

4. SPELL IT TRIVET

Hot serving dishes will be right at home on this mar-resistant, heat-catching landing pad. Using ½" pine, cut four pieces 4½" square, then round the corners and sand all surfaces smooth. Center the letters on the squares, drill starter holes as necessary, and cut out the letters with a jigsaw or a coping saw. Finish the project with a penetrating oil finish. If you plan to make this project for several people, you can save some time by stacking two or three squares and making the cuts at the same time.

5. WHALE OF A CUTTING BOARD

You can feed scraps that are destined for disposal through the whale's jaws and store diced foods in the handy metal bowl. Make the board with ¾" glued-up maple, and finish it with a non-toxic oil. You'll want to cut a recess in the curve of the tail to accept the bowl rim, and add cleats underneath that fit inside the sink to keep the board from shifting.

5

Continued on page 108

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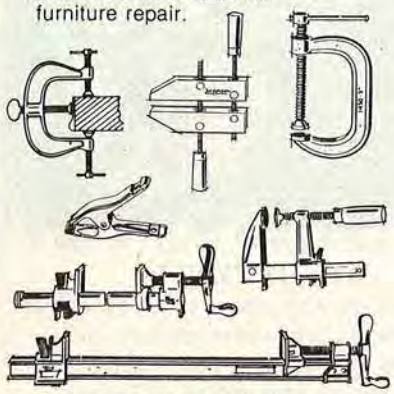

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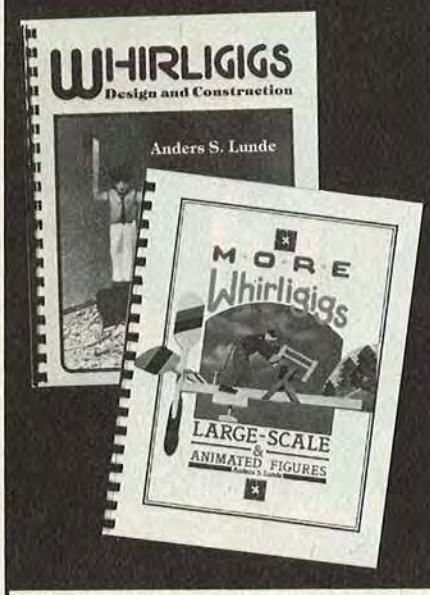

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Continued from page 105

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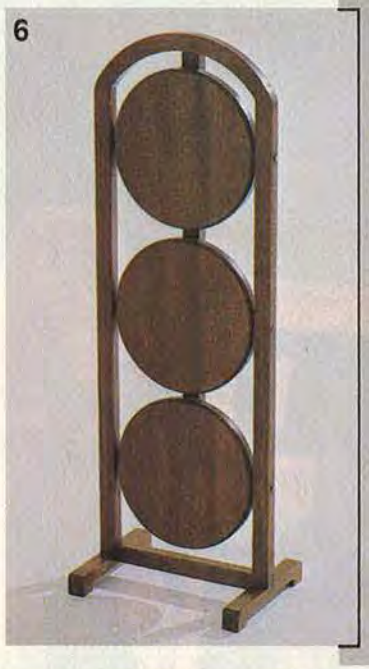

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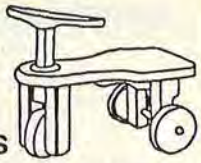

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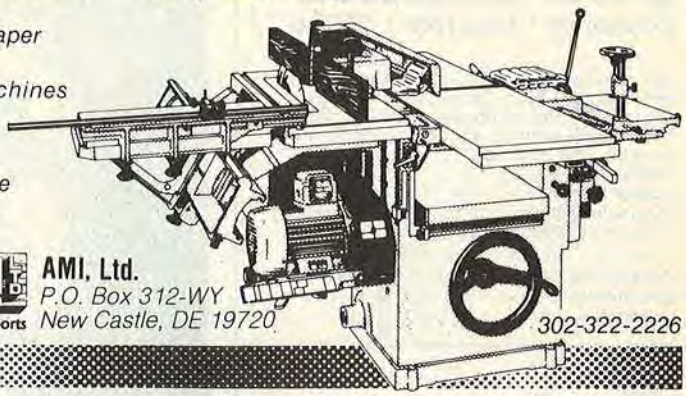

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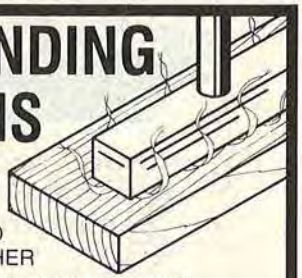

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BONUS PROJECTS

Continued from page 108

idea portfolio

probably at mealtime as well. You can finish it with clear varnish or paint it to match a child's room. **To order plan number 50480, send your name and address, the plan number, plus a check or money order for $5.95 ($4.95 for the plan, plus $1.00 for postage and handling) to: WOOD Reader Service, 1716 Locust Street, Dept. 3MA, Box 374, Des Moines, IA 50336. This plan includes instructions for the doll cradle below, too.**

8. ROCK-A-BYE DOLL CRADLE

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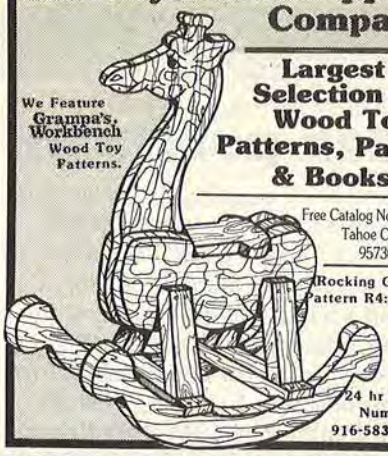

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Continued from page 56

arched mirror frame

1 Rip parts A, B, and C to width, then crosscut them to length, plus 1" or so. Miter-cut one end of each of the A parts, then check the miter joint for a good fit. Glue and clamp the two mitered pieces together. (We used a picture frame clamp to do this.) After the glue dries, cut each leg to its finished length (9⅝").

2 Miter-cut parts B and C their finished length. Then, glue and clamp them together, using picture frame clamps.

3 After the glue dries, glue a temporary clamp block to each B member where shown (we used hot melt glue for this, as it sets up quickly). Check the two subassemblies for a good fit, then glue and clamp them together using bar clamps.

4 Scribe a 1½" radius at each of the bottom corners. Then, locate the center of the arched portion of the frame and scribe the inside and outside radii.

5 Cut the frame to its final shape, then sand all surfaces smooth.

6 With the frame facedown on a flat surface and using a 13/16" spade bit, bore ¼"-deep holes at each of the joint lines. Then, with a 1" hole saw with the pilot drill bit removed, cut and then sand five plugs from scrap oak. Glue and clamp the plugs in the frame.

7 When the glue has dried, cut a ¼" rabbet ⅜" deep around the inside edge of the frame. Square up the corners with a chisel.

8 Round-over the front edges of the frame with ⅜" round-over bit. Sand the frame smooth, then finish as desired.

9 Cut the hardboard backing (D) to size, then secure it and the mirror with push points. (We used the hardboard as a template to have the mirror cut to size.) ■

Bill of Materials

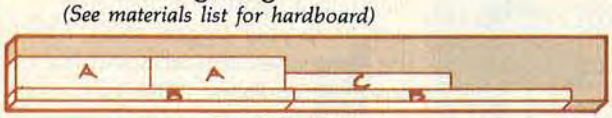
Part	Finished Size* T	W	L	Material	Qty.
A	¾"	3"	9⅝"	oak	2
B	¾"	1½"	17⅜"	oak	2
C	¾"	1½"	12⅝"	oak	1
D	⅛"	10⅛"	20"	hardboard	1

*Some pieces are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

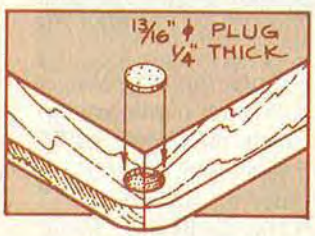
Supplies: woodworker's glue, mirror glass, push points, sawtooth hanger, oil finish

Cutting diagram

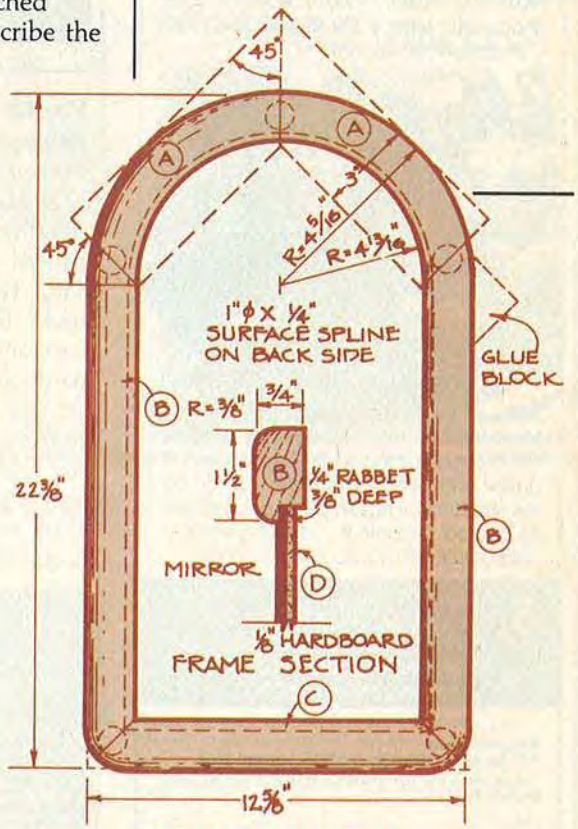
(See materials list for hardboard)



¾" X 5½" X 36" OAK



SURFACE SPLINE DETAIL



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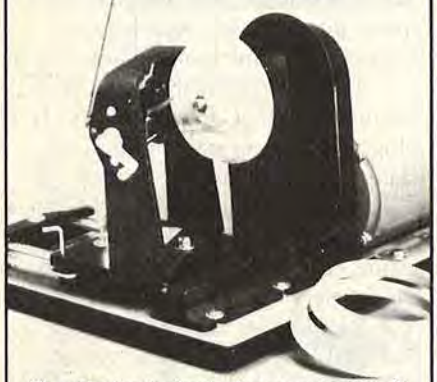

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TIPS FROM YOUR SHOP (AND OURS)

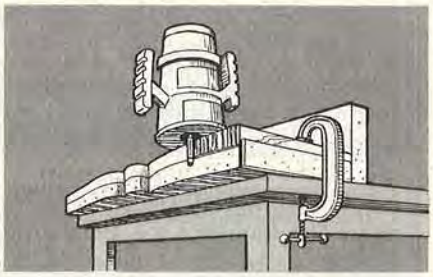
Continued from page 28

Work-saving router template

In production work, when many pieces of the same shape have to be cut and routed, you need something to help increase speed and accuracy.

TIP: Build a plywood template for your router. Make a full-size layout of the finished piece in plywood. Add cleats to the back and sides where no routing will be done. Also glue strips of sandpaper to the top corners of the template so the work won't vibrate.

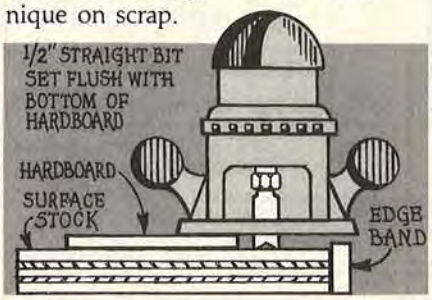
Rough-cut the work piece to within 1/32" of the line, then clamp it to the template. Using a router with a straight-cutting carbide bit and ball-bearing guide, trim off excess as shown.



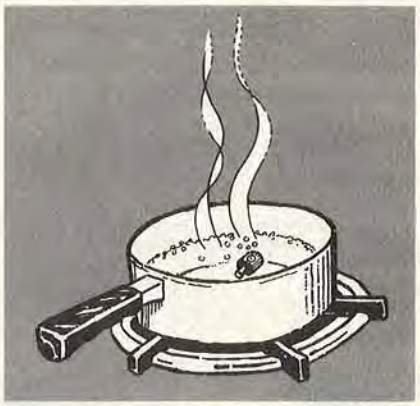
Router flush trimmer

Particularly with today's thin veneers, it's tough to flush out an edge band with surface stock by sanding and not go through the veneer.

TIP: This simple jig does the trick. Remove the plastic router base and screw on a piece of 1/4" hardboard as shown. Adjust a 1/2" straight router bit flush with bottom of the hardboard. Keep the router absolutely vertical and it will cut away any material not flush with the jig. Test the technique on scrap.



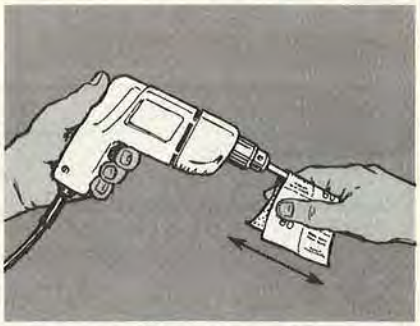
Second wind for clogged aerosols



Inverting and spraying an aerosol can to clear paint material from the nozzle never seems absolutely necessary—until it's time to use the spray can again . . .

TIP: Remove plugged spray-can nozzles and boil them in water for a few minutes. Air bubbles that have been trapped in the paint or other coating material will be forced through the system, clearing the nozzle.

Mini-lathe for oversize dowels



Stock wood-dowel diameters are often slightly too large for the holes that you've drilled.

TIP: To assure a snug fit—and avoid the possibility of splitting your workpiece—chuck the dowel into a drill press or portable drill and sand the piece as it spins. To maintain a consistent diameter (and keep your fingers cool), move the sandpaper up and down the dowel as you sand. Don't oversand! ■

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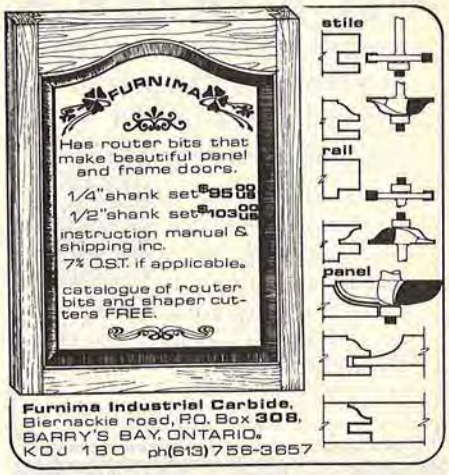

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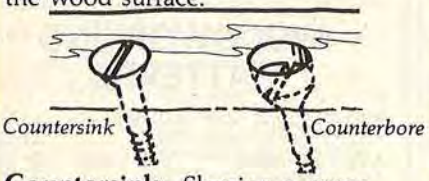
GLOSSARY

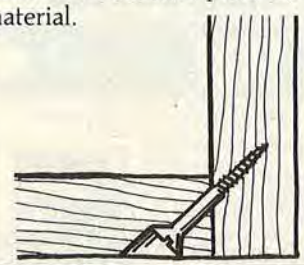
wood words

Apron: A horizontal piece that supports the top or seat and connects the legs of a table or chair.
Burnisher: A round or triangular steel rod with a handle that is used to produce the hooked cutting edge on a cabinet scraper.
Cabinet carcass: The basic, box-like component that is fitted with drawers, shelves, and/or doors in cabinet construction.
Chamfer: The edge of a board that has been beveled at an angle.
Clamp blocks: Wedge-shaped blocks temporarily spot-glued to workpieces so that the parts can be clamped together for gluing.

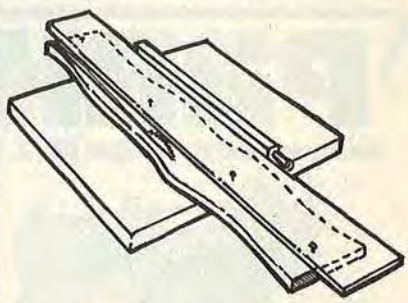
Collet: A device that positions and secures a bit in a router.
Counterbore: Drilling a hole the diameter of a screw head so that the entire screw can be sunk below the wood surface.



Countersink: Shaping a screw hole so that the screw head can be sunk flush with the wood surface.
Dado, groove: Both are channels cut into pieces of lumber or sheet goods. A dado runs across the grain; a groove (also called a plough) runs along the grain.
Jig: A device that holds a workpiece or tool so that a woodworking task can be performed efficiently and accurately.
Length stop: A block of wood fixed in place to serve as a reference point when a number of pieces need to be crosscut to the same length on a radial arm or table saw. Also called a *stop block.*
Open time: The interval between the time an adhesive is applied and the time at which it can no longer be worked. Also called *working time.*
Penetrating finish: A finish, usually wiped on, that soaks into wood pores so that it resides in the wood itself. Tung oil, linseed oil, and Danish oil are examples of penetrating finishes.
Rail, stile: A rail is a horizontal member between two vertical pieces, or stiles, in a cabinet carcass or frame.
Resawing: Reducing a board's thickness by sawing it into thinner pieces. The board's length and width remain the same.
Screw pocket: A hole drilled at an angle into a board or piece of sheet goods to allow it to be screwed to another piece of material.



Slotting cutter: A router bit designed to groove the edges of boards for spline joint assembly.
Spline: A strip of wood, typically ⅛" or ¼" thick, that fits into grooves cut in the edges of two boards butted together, linking them in a spline joint.
Straight-line ripping: A process for trueing one edge of a board that has no straight edge to work from. A piece of straight-edged lumber is attached along the length of the workpiece and run against the saw's rip fence.



Stretcher: A horizontal piece that connects the lower portions of the legs on a table or chair. ■

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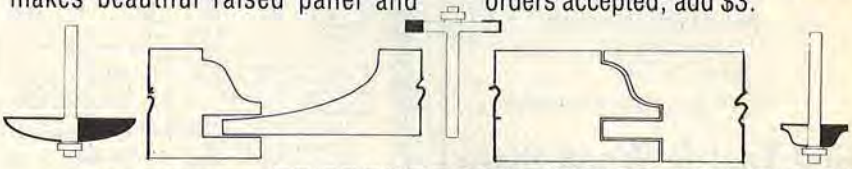

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TIP Sawdust piles up quickly around a shop. Keep this combustible material at a minimum by sweeping or vacuuming often.

TIP Keep all finishing products and other solvent-based items in sealed, labeled containers. Store them in metal cabinets away from heat sources such as your furnace.

TIP Dispose of oily rags once you've finished a project. If you'll be using the same rag on successive days, spread it over a sawhorse or on a coat hanger where air can circulate freely around it, eliminating any possibility for spontaneous combustion.

TIP Inspect electrical power tools often and replace any frayed cords, bad plugs, and faulty motors. Also, unplug all tools not in use.

TIP Equip your shop with GFCI ground fault circuit protection. These devices, available in plug-in, breaker, or receptacle models, sense even minor changes in electrical lines and shut off the power if necessary.

TIP Provide adequate ventilation in your workshop so you can rid the area of any dangerous vapors.

TIP Install a smoke detector in a room or hallway near your shop. Test it often, too.

TIP Keep a dry chemical ABC fire extinguisher in the shop. It will help extinguish fires resulting from combustible solids, flammable liquids, and electrical malfunctions. ■

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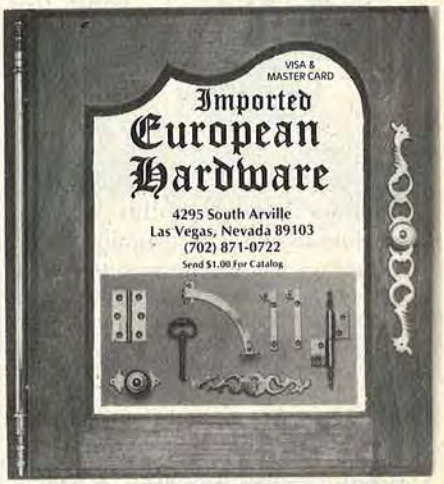

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The wood auction is the featured event of the Society's annual convention, which was recently held in Provo, Utah, an area not known for its abundance of trees. But that never matters, since IWCS members bring their own. Hundreds of wood specimens, ranging in size from thin veneers to huge blocks, whole stumps, and crafted pieces are donated by them to the fund-raising auction, not only to finance operations, but to allow others to easily enlarge their collections.

IWCS members have one thing in common—a reverence of wood. While many turn their wood into bowls, lamps, sculpture, jewelry, and other items, some collectors merely collect. The only prerequisite for membership is an appreciation of wood, and it is pervasive.

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Here are the stated purposes for which the IWCS was formed:

- To collect and disseminate all information considered pertinent and instructive to those interested in collecting and working with native and foreign woody plants.
- To encourage others to become collectors and in the use of wood.
- To assist in accurate naming and classification of specimens whenever the collector or craftsman cannot obtain this service from the source.
- To encourage the exchange of wood specimens upon an organized basis by members and others.
- To encourage craftsmanship in wood and to furnish sources of information and supply.

In addition to annual meetings, members hold regional events where wood is displayed and auctioned, ideas are exchanged, and wood samples are traded.

A monthly bulletin, *World of Wood*, is published by IWCS and tells members about events, craftsmen, and interesting developments. In addition, a membership directory is distributed annually. Both publications are included with IWCS membership of $10.50 in the United States, $12.50 in Canada and Mexico, and $15 elsewhere. *For more information and membership application, write:* Secretary/Treasurer, International Wood Collectors' Society, 601 Burkwood Court E., Urbana, Illinois 61801.■

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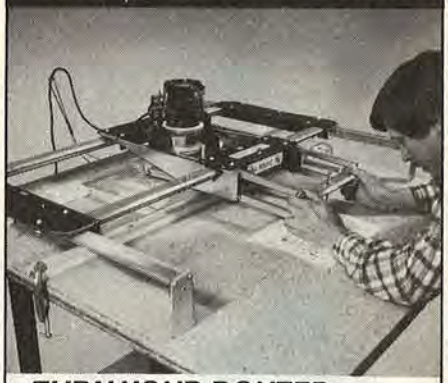

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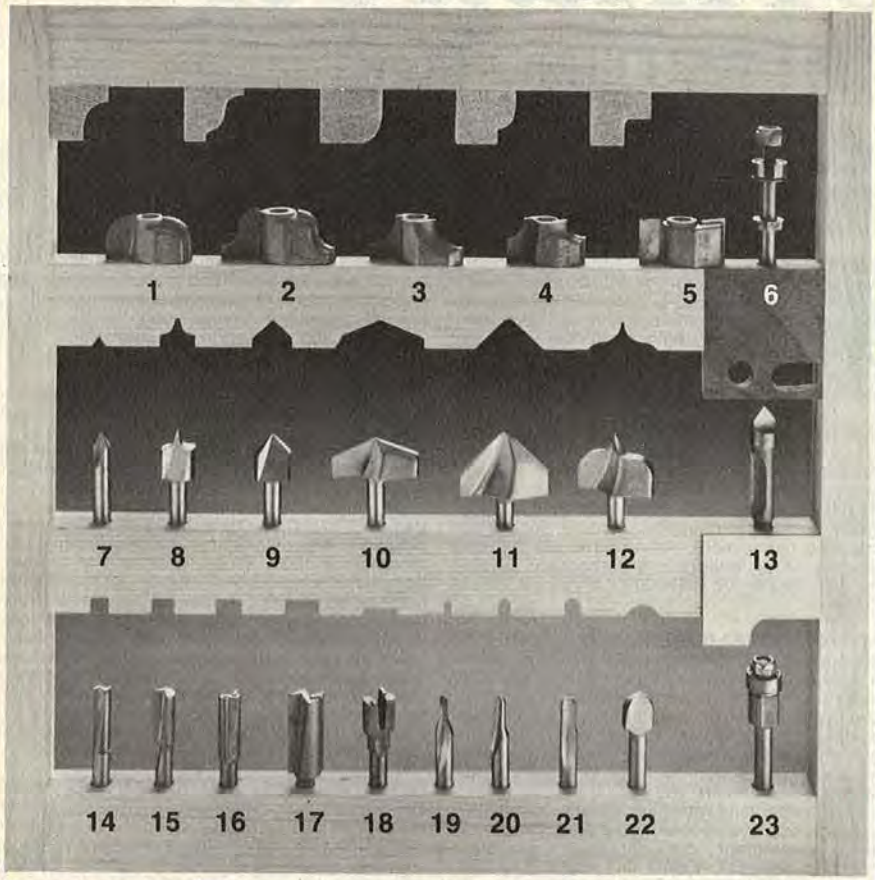

How many of these bits can you name without peeking into the article?

A beginner's guide to router bits

Some folks we know have them all. Others have only the basics. Here's a well-rounded, though not complete, selection that'll get you through most project needs.

Check out the photograph above and you'll quickly discover that router bits come in many different configurations. Each of them has a specific purpose, creating the well-defined shape shown above it in the storage rack.

While steel bits are the most common and least expensive, carbide bits cut better and last longer. The top row of the bits shown includes carbide-edged examples, all of which share the same interchangeable arbor. The bits, left to right, are (1) *cove*, (2) *roman ogee*, (3, 4) *quarter-rounds*, and a (5) *rabbet*. At far right (6) is the *arbor*.

Those in the middle row are steel-edged bits and include a (7) *V-groove*, (8) *point cut quarter-round*, (9) ½" *V-groove chamfering* bit, (10) *panel-raising* bit, (11) ⅞" *V-groove chamfering* bit, (12) a *point-cutting ogee*, and (13), a *panel-cutting* bit for drilling and cutting into paneling.

The bottom row, mostly steel-edged, includes (14, 15, 16, 17) *straight-face* bits for making grooves, dadoes, and rabbets; (18) a *butt-hinge mortise*; (19, 20, 21) decorative *veining* bits; (22) *core box* bit, and (23) a *veneer trimmer* bit for cutting wood veneers and plastic laminate.■

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Better Homes and Gardens®
WOOD,Nov./Dec. 1984
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Numbers below refer to items on which there is a charge.
Please include proper remittance.

10.....1.00 20.....1.00 30.....1.00 50.....2.00 60.....2.00 70.....3.00 80.....1.00	90.....1.00 100.....1.00 110.....1.00 118.....$1.00 120.....3.00 130.....1.00 140.....1.00	180..... 5.00 190..... 3.00 192..... 25¢ 200..... 1.00 210..... 2.00 220..... 1.50 230..... 1.00	290..... 1.00 300..... 2.00 319.... $3.00 320..... 25¢ 356.... $8.50 357.... $7.95 358.... $7.95	359.... $9.95 360..... 1.00 370..... 2.00 380..... 1.50 385.... $1.00 390..... 1.95 400..... 60¢	415.... $1.99 420..... 1.00 450..... 2.00 462.... $1.50 499.... $1.00 500..... 2.00 510..... 1.00	515.....$2.50 550.....40¢

Name (please print) _____

Address _____

City _____

State _____ Zip Code _____

I AM ENCLOSING:

$_____ for priced items

$ 1.00 for handling

$_____ total remittance

OUR EDITORS INVITE YOU TO HELP THEM BY ANSWERING THESE QUESTIONS:

1. How much time in total do you usually spend reading or looking through an average issue of *Wood?*
   - A. ☐ ½ hour to less than 1 hour
   - B. ☐ 1 hour but less than 2 hours
   - C. ☐ 2 hours but less than 3 hours
   - D. ☐ 3 hours but less than 4 hours
   - E. ☐ 4 hours but less than 5 hours
   - F. ☐ 5 hours or more

2. Are you aware of the mail order companies advertising in *Wood?*
   - 1. ☐ Yes
   - 2. ☐ No

3. Within the past 12 months have you bought or ordered merchandise from mail order companies?
   - G. ☐ Yes
   - H. ☐ No

4. Within the past 12 months, how much do you think you spent on ordering merchandise from mail order advertisers?
   - 3. ☐ Less than $50.00
   - 4. ☐ $50.00 to $99.99
   - 5. ☐ $100.00 to $149.99
   - 6. ☐ $150.00 to $199.99
   - 7. ☐ $200.00 to $300.00
   - 8. ☐ Over $300.00
   - 9. ☐ Nothing

5. Are you:
   - I. ☐ Male
   - J. ☐ Female

6. Are you married?
   - 0. ☐ Yes
   - 1. ☐ No

7. Are you employed?
   - K. ☐ Yes
   - L. ☐ No

8. Do you own your own home?
   - 2. ☐ Yes
   - 3. ☐ No
   - 4. ☐ No, but plan to own home in next 12 months

9. Do you presently have a workshop?
   - M. ☐ Yes
   - N. ☐ No

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